

SAUDI ARABIA



CLIMATE TRANSPARENCY REPORT: COMPARING G20 CLIMATE ACTION TOWARDS NET ZERO

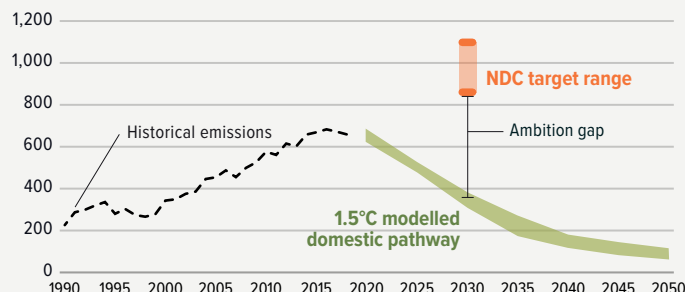
2021

NOT ON TRACK FOR A 1.5°C WORLD

1.5°C Saudi Arabia's estimated NDC target is an increase of 416-562% above 1990 levels, or approximately 861-1,105 MtCO₂e, by 2030. To keep below the 1.5°C temperature limit, Saudi Arabia's 2030 emissions would need to be around 359 MtCO₂e (or 115% above 1990 levels), leaving an ambition gap of 502 MtCO₂e. All figures exclude land use emissions.

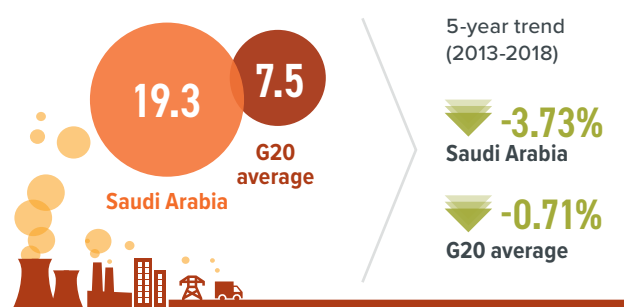
Gütschow et al., 2021; Climate Analytics, 2021

1.5°C compatible emissions pathway (MtCO₂e/year)¹



PER CAPITA GREENHOUSE GAS (GHG) EMISSIONS ABOVE G20 AVERAGE

GHG emissions (incl. land use) per capita (tCO₂e/capita)² in 2018



Saudi Arabia's per capita emissions are 2.6 times the G20 average. Total per capita emissions decreased by 3.7% between 2013 and 2018.

Climate Action Tracker, 2021; Gütschow et al., 2021; United Nations, 2019

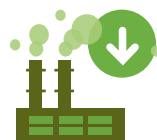
KEY OPPORTUNITIES FOR ENHANCING CLIMATE AMBITION



Shift away from the “circular carbon economy” approach. Commit to **phasing out fossil fuel consumption and production** and **reducing emissions** without reliance on unproven carbon capture technologies and carbon sinks.



Submit an **updated NDC with stronger targets and improved transparency**, including defined baseline emissions.



Industry emissions account for about half of Saudi Arabia's energy-related CO₂ emissions and are growing rapidly. **Adopt mandatory energy efficiency policies to reduce industrial energy use.**

Government of Saudi Arabia, 2015; Lo, 2021a; McQue, 2020

RECENT DEVELOPMENTS



In March 2021, Saudi Arabia announced the **Saudi Green Initiative** which includes the target to **increase renewables in the primary energy mix to 50% by 2030**, from less than 0.1% in 2020.



Saudi Arabia announced the Middle East Green Initiative, to be launched in 2022, bringing together countries in the region to **plant 40 billion trees, restoring 200 million hectares of degraded land.**



In July 2021, **despite targets to eliminate fuel subsidies, Saudi Arabia introduced a ceiling on rising petroleum prices** as domestic demand continued struggling to recover to pre-pandemic levels.

Government of Saudi Arabia, 2021; Paldaviute and Mirza, 2021



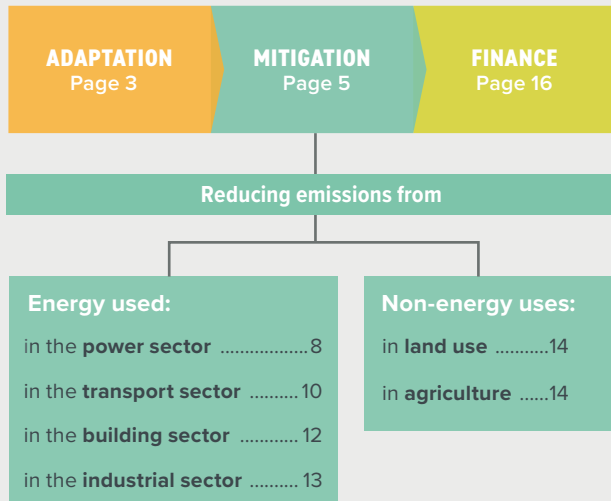
CORONAVIRUS RESPONSE AND RECOVERY

As a top oil producing nation, Saudi Arabia was significantly impacted by the fall in oil prices following the pandemic. The country's spending announced in their budget for 2021 is an estimated 7% lower than spending in 2020, and a deficit of 12% of GDP is expected.

Al Jazeera, 2021; Barbuscia and Rashad, 2020; WHO, 2021

CONTENTS

We unpack Saudi Arabia's progress and highlight key opportunities to enhance climate action across:

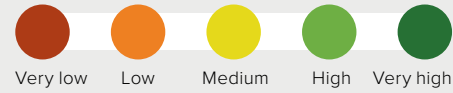


LEGEND

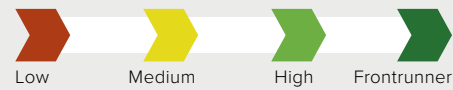
Trends show developments over the past five years for which data are available. The colour-coded arrows indicate assessment from a climate protection perspective: Orange is bad, green is good.



Decarbonisation Ratings³ assess a country's performance compared to other G20 countries. A high score reflects a relatively good effort from a climate protection perspective but is not necessarily 1.5°C compatible.

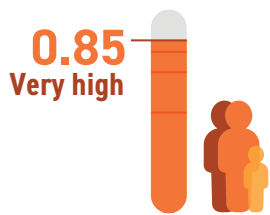


Policy Ratings⁴ evaluate a selection of policies that are essential pre-conditions for the longer-term transformation required to meet the 1.5°C limit.



SOCIO-ECONOMIC CONTEXT

Human Development Index (HDI)

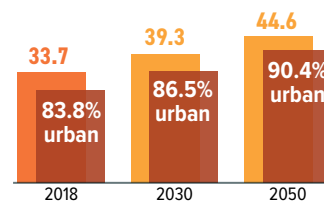


The HDI reflects life expectancy, level of education, and per capita income. Saudi Arabia ranks very high.

Data for 2019. UNDP, 2020

Population and urbanisation projections

(in millions)

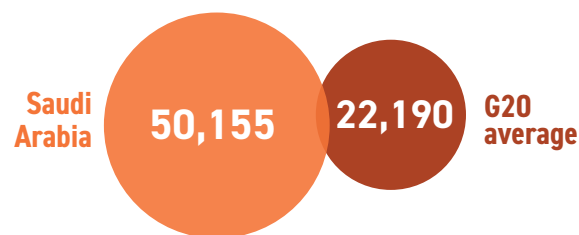


Saudi Arabia's population is projected to increase by 32% by 2050, and become more urbanised. Population growth and urbanisation has put a strain on resources, which will likely be exacerbated by climate change. Saudi Arabia hosted 13 million foreign workers in 2019, 38% of its total population.

United Nations, 2019; United Nations, 2018; UN DESA, 2019

Gross Domestic Product (GDP) per capita

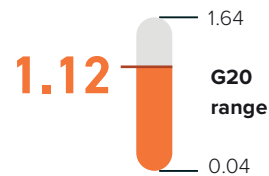
(PPP constant 2015 international \$) in 2019



World Bank, 2021; United Nations, 2019

Death rate attributable to air pollution

Ambient air pollution attributable death rate per 1,000 population per year, age standardised in 2019



Over 18,000 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 higher levels in the G20.

Institute for Health Metrics and Evaluation, 2020

This source differs from the source used in last year's profiles and, therefore, the data are not comparable.

A JUST TRANSITION

Oil and gas have historically contributed to more than half of Saudi Arabia's nominal GDP. The country's NDC prioritises diversifying its economy away from "income generated from a single resource". The 2016 Saudi Vision 2030 framework calls for raising the share of non-oil exports from 16% to 50% of export value by 2030, expanding renewables and localising the renewable energy and industrial equipment sectors, but it also calls for doubling gas production. It aims to reduce unemployment from 11.6% to 9%, but unemployment has only increased since 2016, peaking in 2020 Q2 at 15.4% due to the pandemic, before dropping back to 11.7% in 2021 Q1.

Fair Square, 2020; Government of Saudi Arabia, 2015; Human Rights Watch, 2021; Kingdom of Saudi Arabia, 2016; Robinson, 2021



ADAPTATION

ADDRESSING AND REDUCING VULNERABILITY TO CLIMATE CHANGE



PARIS AGREEMENT Increase the ability to adapt to the adverse effects of climate change and foster climate resilience and low-GHG development.



Saudi Arabia is highly vulnerable to heat stress.
A 2°C increase in global mean temperatures is expected to result in an increase of heat stroke risk twice that of a 1.5°C increase during Hajj and Umrah.



Saudi Arabia ranks eighth in the world for water stress.
Climate change could exacerbate water stress through longer dry periods, high aridity, greater precipitation variability, and projected temperature increases.



A 1°C increase in temperature reduces crop yields by 7-25% in the observed records. Rainfall has a positive effect, but could not offset the adverse effects of temperature.

ADAPTATION NEEDS

Climate Risk Index

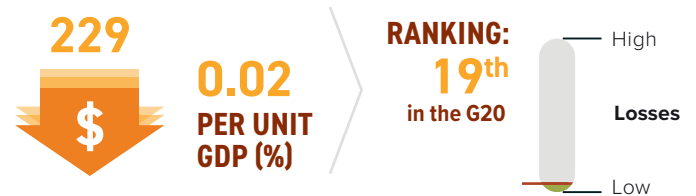
Impacts of extreme weather events in terms of fatalities and economic losses that occurred. All numbers are averages (1999-2018).

Annual weather-related fatalities



Based on Germanwatch, 2019

Annual average losses (US\$ mn PPP)



Based on Germanwatch, 2019

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

Impact ranking scale:



			1.5°C	2°C	3°C
WATER		% of area with increase in water scarcity			
		% of time in drought conditions			
HEAT AND HEALTH		Heatwave frequency			
		Days above 35°C			
AGRICULTURE	Maize	Reduction in crop duration			
		Hot spell frequency			
		Reduction in rainfall			
	Wheat	Reduction in crop duration			
		Hot spell frequency			
		Reduction in rainfall			

Water, Heat and Health: own research; Agriculture: Arnell et al., 2019

Note: These indicators are national scale results, weighted by area and based on global data sets. They are designed to allow comparison between regions and countries and, therefore, entail simplifications. They do not reflect local impacts within the country. Please see technical note for further information.



CORONAVIRUS RESPONSE AND RECOVERY

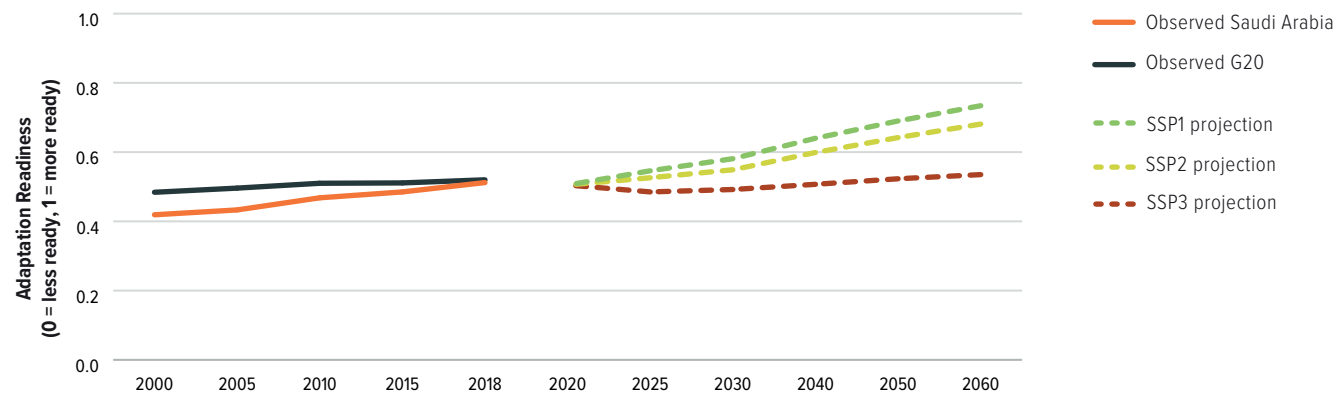
Saudi Arabia's agriculture sector is highly vulnerable to drought and hot spells, which are expected to be exacerbated by climate change, thereby threatening Saudi Arabia's food supply. In response to COVID-19, two initiatives worth a total of USD 665m were introduced to support food imports and local farmers. Part of the local production support includes loans to help cover the capital costs of hydroponic systems, which use 90% less water than traditional farming practices.

Abu-Nasr and Sousa, 2020

Adaptation Readiness

The figure shows 2000-2018 observed data from the Notre Dame Global Adaptation Initiative (ND-GAIN) Index overlaid with projected Shared Socioeconomic Pathways (SSPs) from 2020 to 2060.

Notre Dame Global Adaptation Initiative (ND-Gain) Readiness Index



Saudi Arabia is below the observed average adaptation readiness of the G20 and would be much better positioned to adapt if it implemented measures in step with either SSP1 or SSP2. Socio-economic developments compatible with SSP3 would keep its readiness below the 2015 G20 average for the next 40 years.

The readiness component of the Index created by the ND-GAIN encompasses social (social inequality, information and communications technology infrastructure, education and innovation), economic, and governance indicators to assess a country's readiness

to deploy private and public investments in aid of adaptation. The index ranges from 0 (low readiness) to 1 (high readiness).

The overlaid SSPs are qualitative and quantitative representations of a range of projections of future governance and, therefore, of possible adaptation readiness. The three scenarios shown here in dotted lines are described as a sustainable development-compatible scenario (SSP1), a middle-of-the-road (SSP2), and a 'Regional Rivalry' (SSP3) scenario.

Based on Andrijevic et al., 2020; ND-Gain Index, 2021

ADAPTATION POLICIES

National Adaptation Strategies

No adaptation policy

Nationally Determined Contribution (NDC): Adaptation

TARGETS

Not mentioned

ACTIONS

Actions specified in the following sectors: water, biodiversity/ ecosystems, agriculture, forestry, infrastructure.

MITIGATION

REDUCING EMISSIONS TO LIMIT GLOBAL TEMPERATURE INCREASE



Hold the increase in the global average temperature to well below 2°C above pre-industrial levels and pursue efforts to limit to 1.5°C, recognising that this would significantly reduce the risks and impacts of climate change.

EMISSIONS OVERVIEW



Saudi Arabia's GHG emissions excluding LULUCF have increased by 192% (1990-2018) and the government's climate targets to **reduce emissions by 130 MtCO₂e below business as usual are not in line with a 1.5°C pathway.**

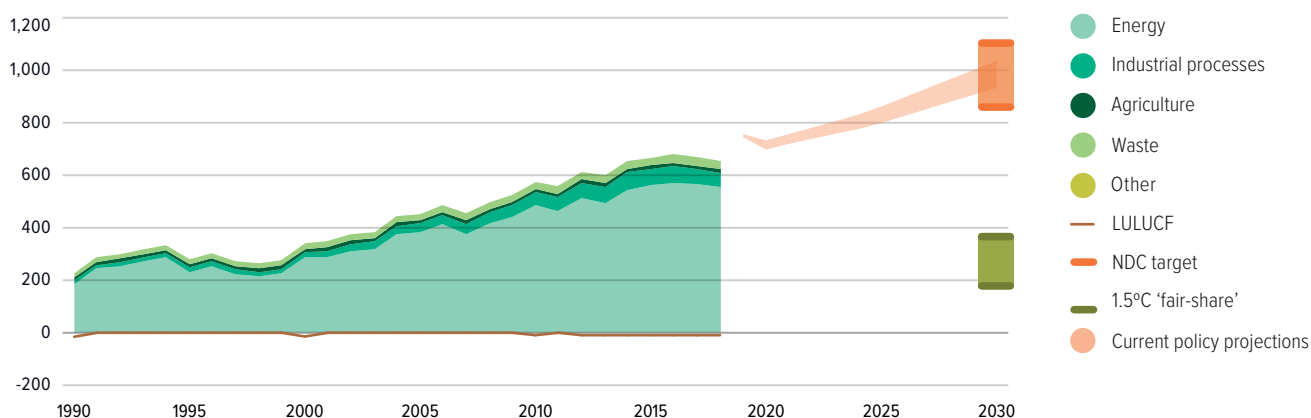


In 2030, global CO₂ emissions need to be 45% below 2010 levels and reach net zero by 2050. Global energy-related CO₂ emissions must be cut by 40% below 2010 levels by 2030 and reach net zero by 2060.

Rogelj et al., 2018

GHG emissions across sectors and CAT 1.5°C 'fair-share' range (MtCO₂e/year)⁵

Total GHG emissions across sectors (MtCO₂e/year)

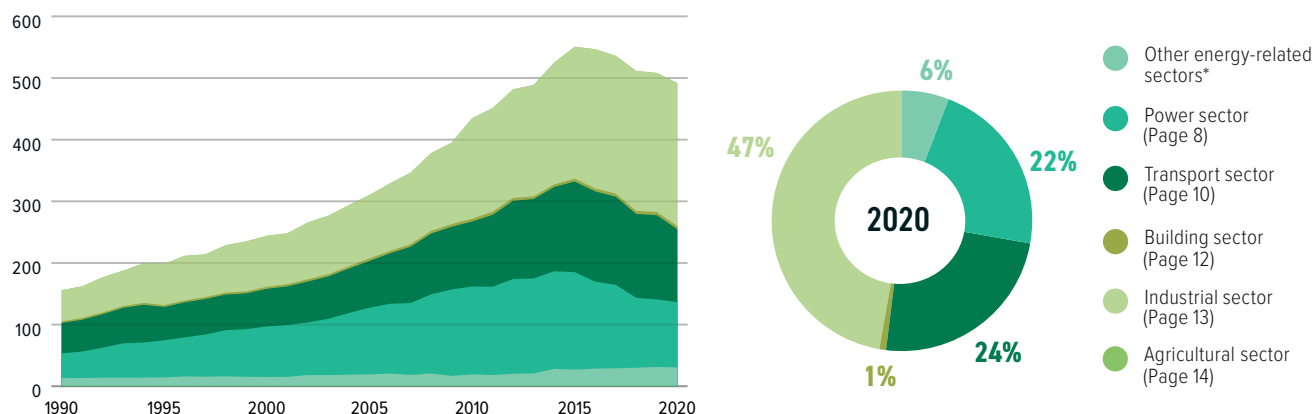


Saudi Arabia's emissions (excl. land use) increased by 192% between 1990 and 2018 to 659 MtCO₂e. When considered by category, increases were seen across all sectors, with industry (328%) and energy (199%) increasing the most. Saudi Arabia should strengthen its target to be in line with its 'fair-share' contribution to the Paris Agreement's 1.5°C temperature limit.

Gütschow et al., 2021; Climate Action Tracker, 2020a, 2021

Energy-related CO₂ emissions by sector

Annual CO₂ emissions from fuel combustion (MtCO₂/year)



The largest driver of overall GHG emissions are CO₂ emissions from fuel combustion. In Saudi Arabia, emissions have increased from 1990 levels, but have been declining since 2015. Industry, at 47%, is the largest contributor, followed by transport at 24% and the power sector at 22%.

Enerdata, 2021 Due to rounding, some graphs may sum to slightly above or below 100%

*"Other energy-related sectors" covers energy-related CO₂ emissions from extracting and processing fossil fuels.

ENERGY OVERVIEW



Saudi Arabia's energy mix is entirely dominated by fossil fuels, with **less than 0.1% of energy from renewables**. In 2020, **oil accounted for 62% of energy consumption and natural gas 38%**. This is among the G20's highest, which averages 82% fossil fuel consumption in the energy mix.

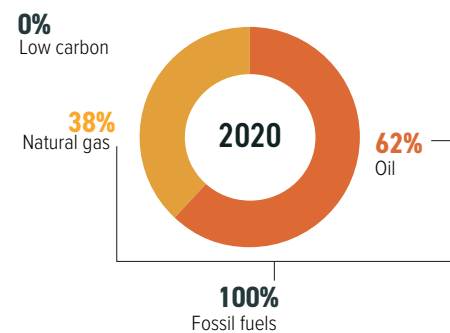
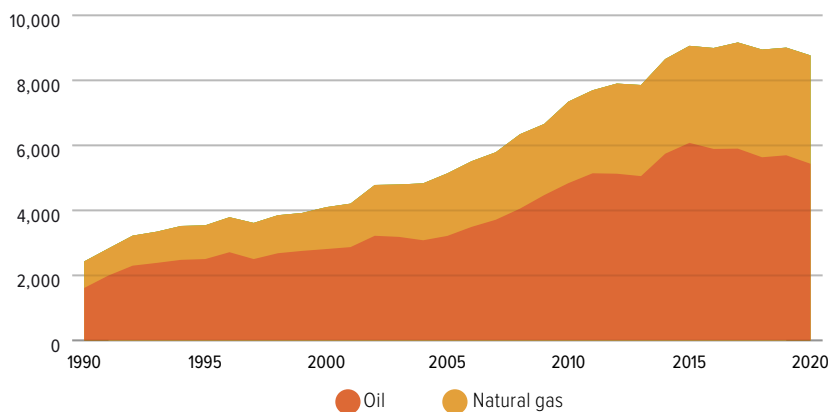


The share of fossil fuels globally needs to fall to 67% of global total primary energy by 2030 and to 33% by 2050, and to substantially lower levels without carbon capture and storage (CCS).

Rogelj et al., 2018

Energy mix

Total primary energy supply (TPES) (PJ)

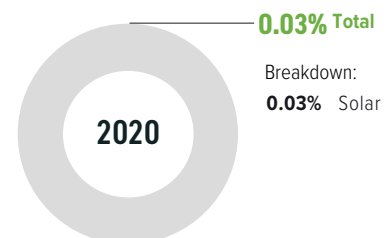
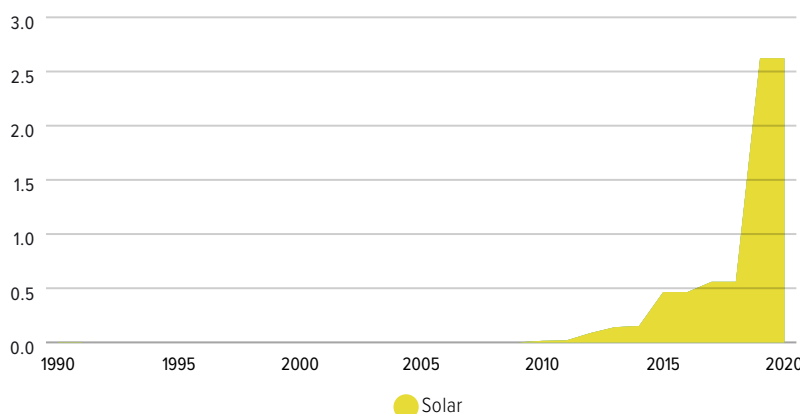


This graph shows the fuel mix for all energy supply, including energy used not only for electricity generation, heating, and cooking, but also for transport fuels. Fossil fuels (oil, coal, and gas) make up 100% of the Saudi Arabia energy mix, which is higher than the G20 average. While the share of renewable energy has increased, with solar starting to come online in 2020, renewables remain a negligible share of the energy mix.

Enerdata, 2021 Due to rounding, some graphs may sum to slightly above or below 100%

Solar, wind, geothermal, and biomass development

TPES from solar, wind, geothermal and biomass (PJ)

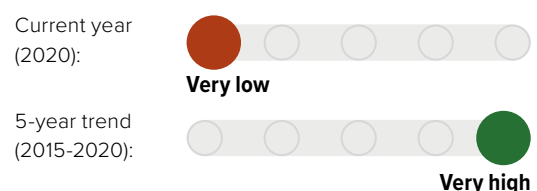


Solar, wind, geothermal and biomass account for 0.03% of Saudi Arabia's energy supply – the G20 average is 7.1%. The renewables share in total energy supply has increased by around 483.6% in the last five years in Saudi Arabia (2015-2020) but remains negligible. Renewable energy in the Saudi primary energy mix is entirely from solar.

Enerdata, 2021 Due to rounding, some graphs may sum to slightly above or below 100%

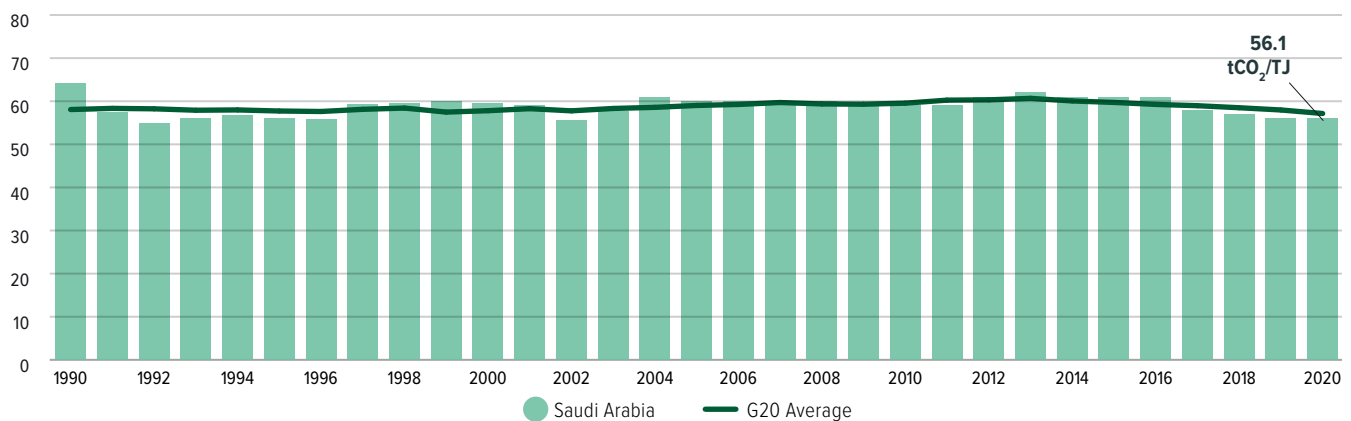
Note: Large hydropower and solid fuel biomass in residential use are not reflected due to their negative environmental and social impacts.

Decarbonisation rating: renewable energy share of TPES compared to other G20 countries



Carbon intensity of the energy sector

Tonnes of CO₂ per unit of TPES (tCO₂/TJ)

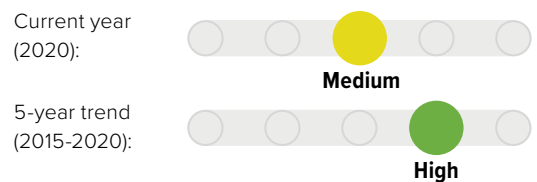


Carbon intensity is a measure of how much CO₂ is emitted per unit of energy supply.

Carbon intensity of the energy supply in Saudi Arabia has remained relatively constant since 1990, but since 2013 has begun to decline as oil use has decreased slightly in the energy mix. Saudi Arabia's carbon intensity is close to the G20 average, but is declining about twice as fast.

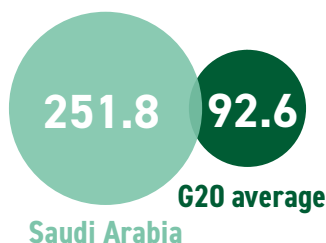
Enerdata, 2021

Decarbonisation rating: carbon intensity of the energy sector compared to other G20 countries

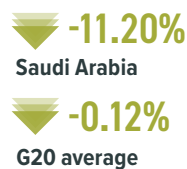


Energy supply per capita

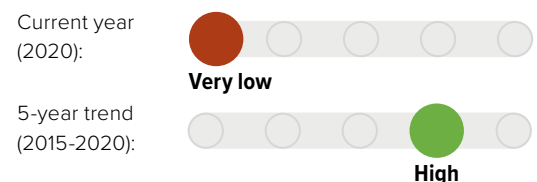
TPES per capita (GJ/capita) in 2020



TPES per capita (GJ/capita): 5-year trend (2015-2020)



Decarbonisation rating: energy supply per capita compared to other G20 countries

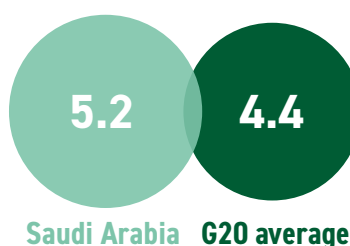


The level of energy use per capita is closely related to economic development, climatic conditions and the price of energy. Energy use per capita in Saudi Arabia is, at 251.81 GJ/capita in 2020, well above the G20 average, but has been decreasing faster at 11.2% between 2015 and 2020 in contrast to the decreasing G20 average of 0.12% over the same period.

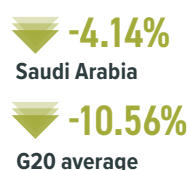
Enerdata, 2021; United Nations, 2019

Energy intensity of the economy

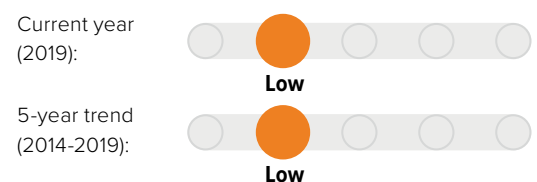
(TJ/million US\$2015 GDP) in 2019



Energy intensity of the economy: 5-year trend (2014-2019)



Decarbonisation rating: energy intensity compared to other G20 countries

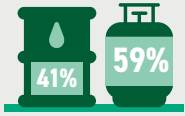


This indicator quantifies how much energy is used for each unit of GDP. This is closely related to the level of industrialisation, efficiency achievements, climatic conditions or geography. Saudi Arabia's energy intensity is higher than the G20 average and has been decreasing at a lower rate of 4.14% between 2014 and 2019 as compared to the G20.

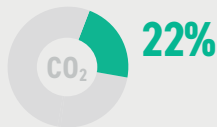
Enerdata, 2021; World Bank, 2021

POWER SECTOR

Emissions from energy used to make electricity and heat



In 2020, electricity and heat production was responsible for 22% of Saudi Arabia's energy-related CO₂ emissions: **it produced 59% of electricity from natural gas; 41% from oil**. Oil has declined in the power sector since 2015, largely replaced with natural gas. Renewables, in the form of solar power, account for less than 1% of the power mix.



Share of energy-related CO₂ emissions from electricity and heat production in 2020.

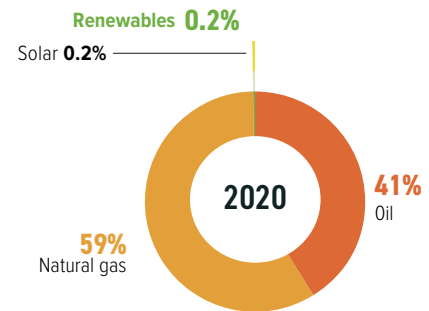
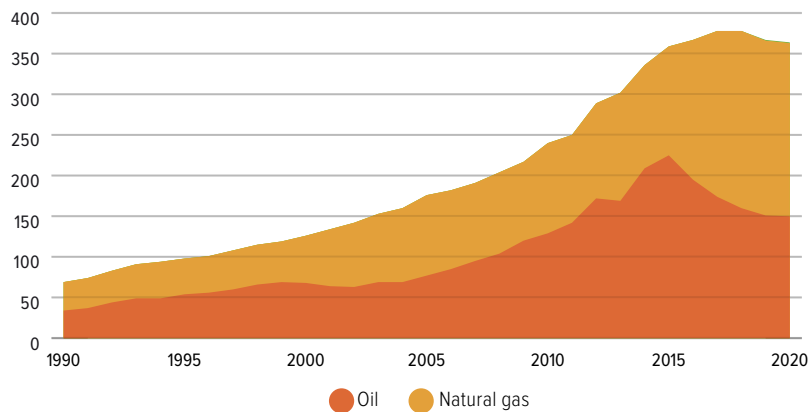


Worldwide, coal use for power generation needs to peak by 2020, and between 2030 and 2040, all the regions of the world need to phase out coal-fired power generation. By 2040, the share of renewable energy in electricity generation has to be increased to at least 75%, and the share of unabated coal reduced to zero.

Rogelj et al., 2018; Climate Action Tracker, 2020b

Electricity generation mix

Gross power generation (TWh)

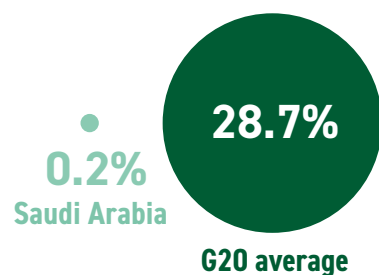


Saudi Arabia generated almost 100% of its electricity from fossil fuels in 2020. The share of renewable energy in Saudi Arabia's power sector has been increasing, but still accounted for **less than 1%** of the power mix in 2020. This is very low compared to the G20 average of 29%.

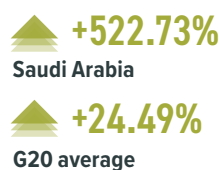
Enerdata, 2021 Due to rounding, some graphs may sum to slightly above or below 100%

Share of renewables in power generation

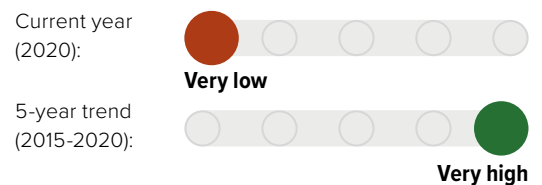
(incl. large hydro) in 2020



Share of renewables in power generation:
5-year trend (2015-2020)



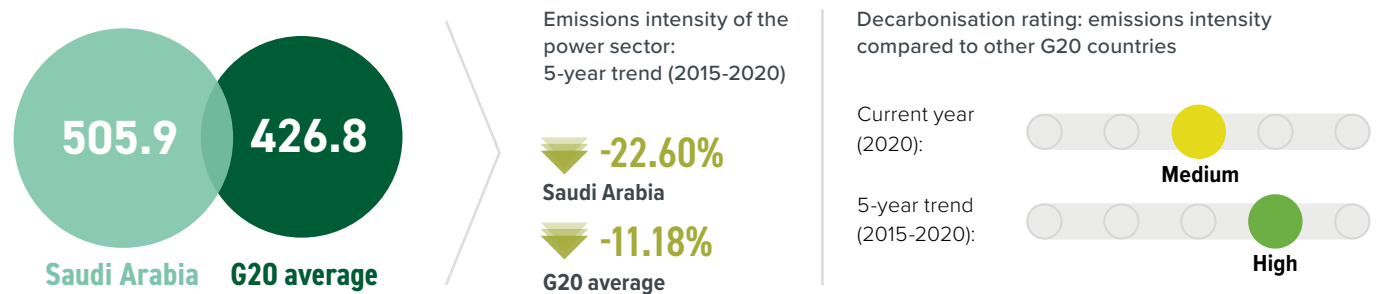
Decarbonisation rating: share of renewables compared to other G20 countries



Enerdata, 2021

Emissions intensity of the power sector

(gCO₂/kWh) in 2020



For each kilowatt hour of electricity, 505.9 g of CO₂ are emitted in Saudi Arabia. Emissions intensity is decreasing because the share of oil in the power mix is declining.

Enerdata, 2021

POLICY ASSESSMENT

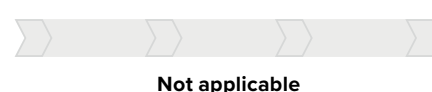
Renewable energy in the power sector



The Saudi Green Initiative, announced in 2021, aims to achieve a 50% share of renewables in the total energy mix by 2030. In 2019, Saudi Arabia raised its renewable energy capacity target threefold – from 9.5 GW by 2023 to 27.3 GW by 2024 and 58.7 GW installed capacity by 2030. Despite the ambitious targets, actual implementation has been slow. The government's green hydrogen future city megaproject in Neom is planned to be powered by 4 GW of wind, solar and storage.

ACWA Power, 2021; Government of Saudi Arabia, 2021; Power Technology, 2021; Vivid Economics, 2021

Coal phase-out in the power sector



Saudi Arabia does not use coal for power generation.

CORONAVIRUS RESPONSE AND RECOVERY

Saudi Arabia's stimulus measures rank among the lowest of G20 countries in terms of "greenness" for supporting high-emission industries, for example, through fuel subsidies. However, recent announcements such as the Saudi Green Initiative have shown some commitment to green recovery. In March 2021, Saudi Arabia signed a Declaration of Intent with Germany to cooperate on green hydrogen and has progressed on its green hydrogen megaproject, Neom. In April 2021, the government announced a Red Sea tourism project that it claims will be net zero. The project's ACWA Power-led consortium has signed an memorandum of understanding (MOU) to fuel the project's transportation network entirely with biofuels.

ACWA Power, 2021; Government of Saudi Arabia, 2021; Power Technology, 2021; Vivid Economics, 2021

TRANSPORT SECTOR

Emissions from energy used to transport goods and people

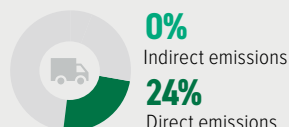


Emissions from transport have been declining since 2015, driven by declining fuel consumption. **The transport sector is still 100% supplied by oil**, with no electric vehicle (EV) market and no progress with biofuels. **In order to stay within a 1.5°C limit, passenger and freight transport need to be decarbonised.**



The share of low-carbon fuels in the transport fuel mix globally must increase to between 40% and 60% by 2040 and 70% to 95% by 2050.

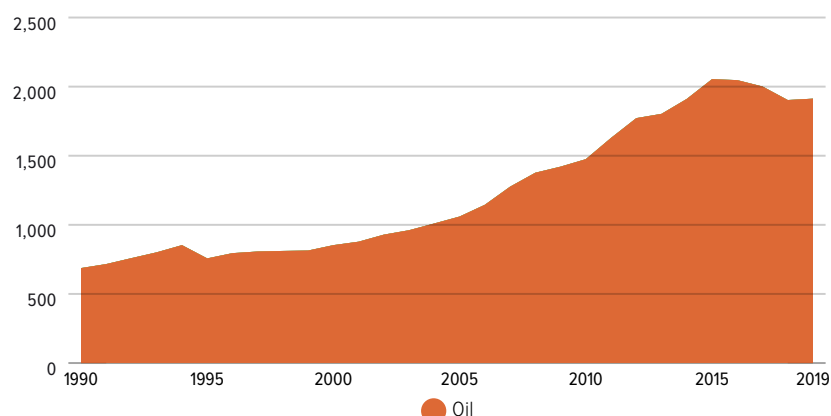
Rogelj et al., 2018; Climate Action Tracker, 2020b



Share of transport in energy-related CO₂ emissions

Transport energy mix

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

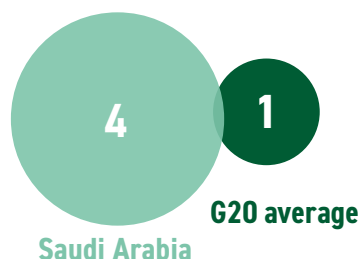


Electricity and biofuels are not used for transport in Saudi Arabia.

Enerdata, 2021 Due to rounding, some graphs may sum to slightly above or below 100%

Transport emissions per capita

excl. aviation (tCO₂/capita) in 2020



Transport emissions:
5-year trend (2015-2020)

▼ -13.40%

Saudi Arabia

▼ -4.3%

G20 average

Decarbonisation rating: transport emissions
compared to other G20 countries

Current year
(2020):



5-year trend
(2015-2020):

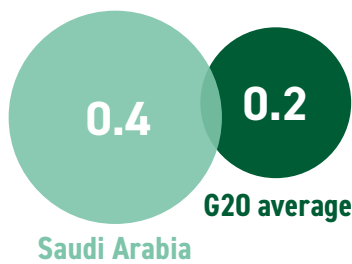


Reductions in transport emissions per capita in 2020, and concomitant changes in the 5-year trends and decarbonisation ratings, reflect widespread economic slowdowns and transport restrictions imposed in response to the COVID-19 pandemic. For a discussion of broader trends in the G20 and the rebound of transport emissions in 2021, please see the Highlights Report at www.climate-transparency.org

Enerdata, 2021; United Nations, 2019

Aviation emissions per capita⁶

(tCO₂/capita) in 2018



Aviation emissions:
5-year trend (2013-2018)

▲ +44.84%

Saudi Arabia

▲ +21.25%

G20 average

Decarbonisation rating: aviation emissions
compared to other G20 countries

Current year
(2018):



5-year trend
(2013-2018):



Enerdata, 2021; International Energy Agency, 2020; United Nations, 2019

Motorisation rate



135 VEHICLES

per 1,000 inhabitants in
2019 in Saudi Arabia*

Enerdata, 2021

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

No data available for Saudi Arabia

Passenger transport

(modal split in % of passenger-km) in 2018*

No data available for Saudi Arabia

Freight transport

(modal split in % of tonne-km) in 2018*

No data available for Saudi Arabia

*Owing to the variety of sources and data years available, these data are not comparable across G20 countries.

POLICY ASSESSMENT

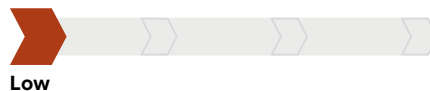
Phase out fossil fuel cars



Saudi Arabia has no plan to phase out fossil fuel cars. However, in 2016, it implemented a fuel efficiency standard for cars, which was updated in 2019. In 2018, its sovereign wealth fund invested USD 1bn in a US-based EV manufacturer and signed an agreement to install EV charging stations. Under the Red Sea tourism project, an agreement has been signed to have the entire project's transportation system fuelled with biofuels.

ACWA Power, 2021; Arnold, 2018; Sheldon and Dua, 2019; Utilities Middle East, 2019

Phase out fossil fuel heavy-duty vehicles



Saudi Arabia has no plans to reduce absolute emissions from freight transport. In 2014, it issued new regulations for the "rolling resistance" and "wet grip" of tyres to improve the energy efficiency of heavy-duty vehicles (HDVs). Saudi Arabia is currently assessing two initiatives to further improve the energy efficiency of HDVs. One initiative was to introduce regulations to improve fuel economy by enforcing anti-idling and aerodynamics. Although the aerodynamics regulations were slated for publication in 2019, they have not yet been issued. The second initiative was aimed at accelerating the retirement of inefficient HDVs.

SEEC, 2018

Modal shift in (ground) transport



The Vision 2030 sets out qualitative objectives to increase the use of public transport and improve the efficiency of railways. In July 2021, the government announced plans to invest USD 147bn in the transport sector by 2030; however, this includes significant plans to expand air travel (passenger and freight). The 2015 Saudi Railway Master Plan aims to construct 9,900 km of railway (2010-2040) with an initial investment of USD 97.4bn. Several metro projects are underway in major cities, including the USD 27bn Riyadh metro project, which is expected to open some lines by the end of 2021.

Oxford Business Group, 2020; Kingdom of Saudi Arabia, 2016; Salman, 2021

BUILDING SECTOR

Emissions from energy used to build, heat and cool buildings



Direct emissions and indirect emissions from the building sector in Saudi Arabia account for 0.95% and 16.60% of total energy-related CO₂ emissions, respectively. Per capita emissions from the building sector are almost double the G20 average. **Saudi Arabia's policies are not sufficient for a 1.5°C pathway.**



0.95%
Direct emissions
16.6%
Indirect emissions

Share of buildings in energy-related CO₂ emissions. Building emissions occur directly (burning fuels for heating, cooking, etc) and indirectly (grid-electricity for air conditioning, appliances, etc.)

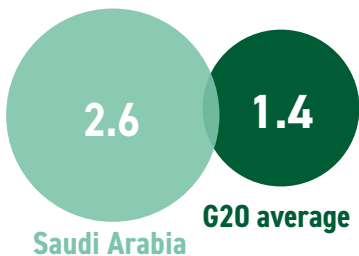


By 2040, global emissions from buildings need to be reduced by 90% from 2015 levels, and be 95-100% below 2015 levels by 2050, mostly through increased efficiency, reduced energy demand, and electrification in conjunction with complete decarbonisation of the power sector.

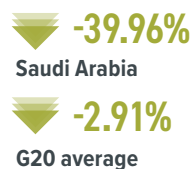
Rogelj et al., 2018; Climate Action Tracker, 2020b

Building emissions per capita

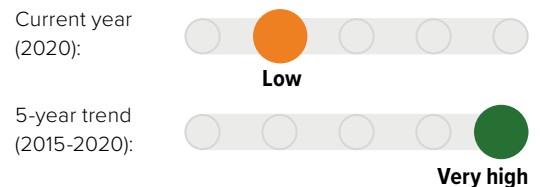
(incl. indirect emissions) (tCO₂/capita) in 2020



Building emissions:
5-year trend (2015-2020)



Decarbonisation rating: building emissions compared to other G20 countries



Building-related emissions per capita are nearly double the G20 average as of 2020. This reflects the high fossil fuel share of the electricity mix. In contrast to the G20 average, Saudi Arabia has managed to decrease the level by 40% (2015-2020).

Enerdata, 2021; United Nations, 2019

POLICY ASSESSMENT

Near zero energy new buildings



Saudi Arabia has no long-term strategy for zero energy new buildings. Mandatory energy efficiency standards and regulations do, however, apply to the residential and commercial sectors, such as mandatory use of thermal insulation. The Saudi Green Building Forum promotes the construction of energy- and resource-efficient and environmentally-responsible buildings. As of 2020, it has over 3,000 green registered and certified projects.

Howarth et al., 2020; Saudi Electricity Company, 2021; Saudi Green Building Forum, 2021; SEEC, 2021a

Renovation of existing buildings



Saudi Arabia has no building retrofit policies nor strategy in place, though it does have some measures to promote retrofitting. In 2017, the sovereign Public Investment Fund established The National Energy Services Company (Tarshid) to advance energy efficiency priorities, including the retrofit of public buildings and facilities. In 2019, the Saudi Energy Efficiency Centre launched the full rollout of its High Efficiency AC Initiative to boost production and adoption of high efficiency air conditioners.

Graves, 2017; SEEC, 2021b; Tarshid, 2021

INDUSTRY SECTOR

Emissions from energy use in industry



Direct emissions and indirect emissions from industry in Saudi Arabia make up 47.2% and 3.0% of energy-related CO₂ emissions respectively. **Saudi Arabia lacks effective policies to increase the energy efficiency of the industry sector** nor any effective policies to reduce emissions and to decarbonise the sector.



Industrial emissions need to be reduced by 65-90% from 2010 levels by 2050.

Rogelj et al., 2018



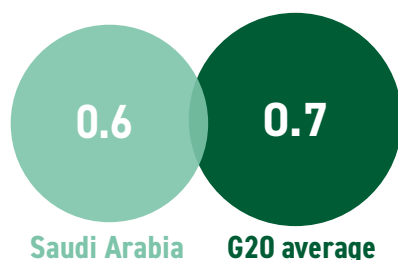
47.21%
Direct emissions

3.01%
Indirect emissions

Share of industry in energy-related CO₂ emissions.

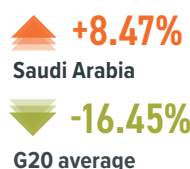
Industry emissions intensity⁷

(tCO₂e/USD2015 GVA) in 2017



Enerdata, 2021; World Bank, 2021

Industry emissions intensity:
5-year trend (2012-2017)



Decarbonisation rating: industry emissions intensity compared to other G20 countries

Current year (2017):



5-year trend (2012-2017):



Carbon intensity of steel production⁸

(kgCO₂/tonne product) in 2016

No data available



Saudi Arabia **World average**

Steel production and steelmaking are significant GHG emissions sources, and challenging to decarbonise.

World Steel Association, 2018

POLICY ASSESSMENT

Energy efficiency



Since 2011, Saudi Arabia has implemented an energy efficiency framework for industrial plants. **The industrial sector had an overall target to improve energy intensity by around 9% from 2010 to 2019, or 1% per year.** No information is currently available on whether these targets have been achieved. The Saudi Industrial Development Fund provides soft loans for energy efficiency related projects in industry.

Howarth et al., 2020

LAND USE SECTOR

Emissions from changes in the use of the land



Forests cover less than 1% of Saudi Arabia's territory. However, coastal mangroves and low density shrublands are relevant carbon stores.



Global deforestation needs to be halted and changed to net CO₂ removals by around 2030.

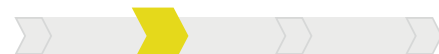
Rogelj et al., 2018

Annual forest expansion, deforestation and net change

No data available for Saudi Arabia

POLICY ASSESSMENT

Target for net zero deforestation



Medium

In 2021, Saudi Arabia announced the Saudi Green Initiative and the Middle East Green Initiative. The Saudi Green Initiative includes the planting of 10 billion trees, which it estimates is equivalent to rehabilitating roughly 40 million hectares of degraded lands and a 12-fold increase of current tree cover. The Middle East Green Initiative aims to bring together countries in the region to plant 40 billion trees. The efficacy of mass tree planting has been questioned given the country's climate, but an emphasis on local drought resistant plants and mangroves could reduce potential water stress and tree mortality rates.

Castelier, 2021; Government of Saudi Arabia, 2021; Lo, 2021b

AGRICULTURE SECTOR

Emissions from agriculture



Saudi Arabia's agricultural emissions are mainly from livestock manure and digestive processes (mainly cattle). **A 1.5°C compatible pathway requires behavioural and dietary shifts and less fertiliser use.**

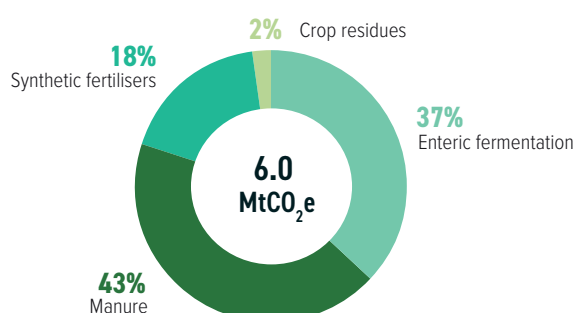


Methane emissions (mainly enteric fermentation) need to decline by 10% by 2030 and by 35% by 2050 (from 2010 levels). Nitrous oxide emissions (mainly from fertilisers and manure) need to be reduced by 10% by 2030 and by 20% by 2050 (from 2010 levels).

Rogelj et al., 2018

Emissions from agriculture (excluding energy)

Emissions from the agriculture sector in 2018



In Saudi Arabia, the largest sources of GHG emissions in the agriculture sector are livestock manure (43%) and enteric fermentation (37%). Dietary changes and efficient use of fertilisers as well as reductions in food waste could help reduce emissions from this sector. During the Hajj season, Saudi typically imports over three million heads of goats, sheep, cattle and camels to feed pilgrims and for religious sacrifice.

FAO, 2021; Yussuf, 2020

Due to rounding, some graphs may sum to slightly above or below 100%

MITIGATION: TARGETS AND AMBITION

WARMING OF

2.4°C

The combined mitigation effect of Nationally Determined Contributions (NDCs) assessed in April 2021 is **not sufficient and will lead to a warming of 2.4°C by the end of the century**. This highlights the urgent need for all countries to submit more ambitious targets by COP26, as they agreed to do in 2015, and to **urgently strengthen their climate action to align to the Paris Agreement's temperature goal**.

Climate Analytics, 2021a

AMBITION: 2030 TARGETS

Nationally Determined Contribution (NDC): Mitigation

TARGETS

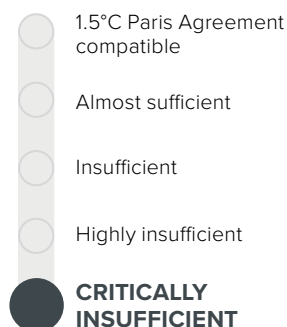
Annually abate up to 130 MtCO₂e by 2030 through contributions that have co-benefits that diversify the economy and mitigate GHG emissions.

ACTIONS

Actions specified in the following sectors: energy, industry, buildings, transport.

Climate Action Tracker (CAT) evaluation of targets and actions

SAUDI ARABIA'S OVERALL RATING



This CAT evaluation is a **new, overall rating**, that combines the several, separately rated elements, of policies and actions, domestic and internationally supported targets, 'fair-share target' and the country's contribution to climate finance. The "Critically insufficient" rating indicates that Saudi Arabia's climate policies and commitments reflect minimal to no action and are not at all consistent with the Paris Agreement.

Saudi Arabia's 2030 climate commitment is highly unclear, due to a lack of data availability, including the absence of any national emissions projections and the fact that Saudi Arabia has not published the baseline corresponding to its Paris Agreement target. Saudi Arabia's 2030 emissions reduction target is rated as "Critically insufficient" both when compared to modelled domestic emission pathways and when compared with its fair-share contribution to climate action. Under Saudi Arabia's current targets and policies, emissions will continue to rise and are consistent with more than 4°C warming. Saudi Arabia needs to set a more ambitious target for emissions reductions and implement associated policies to get a better rating. For the full assessment of the country's target and actions, and the explication of the methodology see www.climateactiontracker.org

Climate Action Tracker, 2021

This assessment includes our policy analysis from 22 September 2020 translated into our new rating methodology without new analysis of Saudi Arabia's climate policies since then.

TRANSPARENCY: FACILITATING AMBITION

Countries are expected to communicate their NDCs in a clear and transparent manner in order to ensure accountability and comparability. The NDC Transparency Check has been developed in response to Paris Agreement decision 1/CP.21 and the Annex to decision 4/CMA.1, which sets out the "information to facilitate clarity, transparency and understanding" as crucial elements of NDCs.

NDC Transparency Check recommendations

Saudi Arabia's NDC was submitted to the UNFCCC on 11 March 2016. To ensure clarity, transparency and understanding, it is recommended that Saudi Arabia provides additional detailed information in its next NDC or NDC update, including:

- Detail on how the baseline was constructed, the sources, and circumstances under which the values of the reference indicators may be updated.
- Explicit information on coverage of sectors and carbon pools covered and how land sector emissions are accounted.
- Information on considerations of fairness and ambition of the NDC, and grounds to substantiate Saudi Arabia's NDC is aligned to the "well below 2°C" target.
- Reference to the year in which the emissions are planned to peak.

For more visit www.climate-transparency.org/ndc-transparency-check

AMBITION: LONG-TERM STRATEGIES

The Paris Agreement invites countries to communicate mid-century, long-term, and low-GHG emissions development strategies by 2020. Long-term strategies are an essential component of the transition toward net zero emissions and climate-resilient economies.

Status	No information available
Interim steps	
Sectoral targets	
Net zero target	
Net zero year	

FINANCE

MAKING FINANCE FLOWS CONSISTENT WITH CLIMATE GOALS



Make finance flows consistent with a pathway towards low-GHG emissions and climate-resilient development.



In 2020, Saudi Arabia spent USD 17bn on fossil fuels subsidies; almost all of which was on petroleum (61%).

Fossil fuel subsidies have generally decreased. These estimates are for consumption subsidies alone, obtained adopting the price-gap approach (unlike the data provided for the other G20 countries in this report).



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

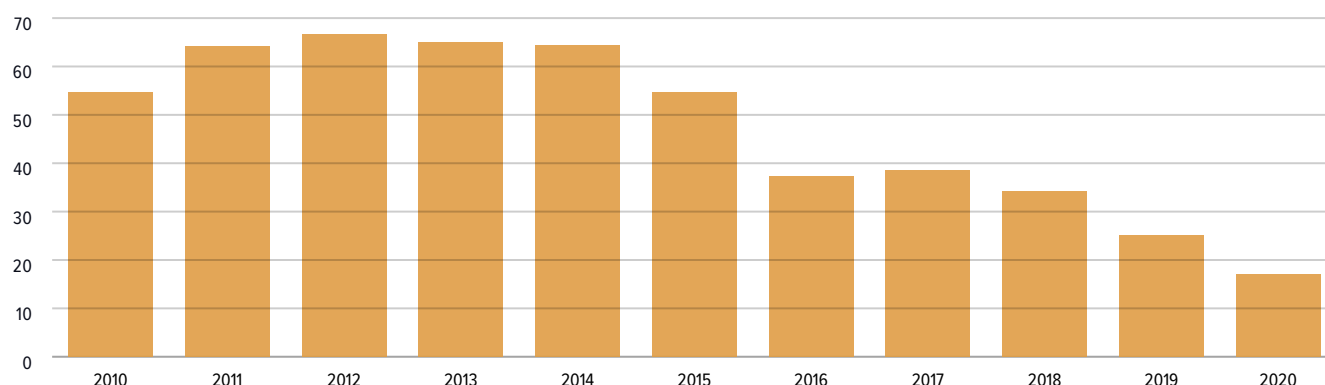
Rogelj et al., 2018

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 the price.

Fossil fuel subsidies

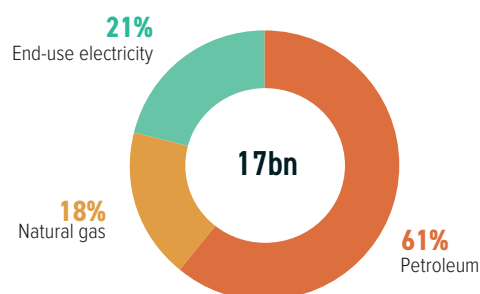
(USD billions)



OECD-IEA Fossil Fuel Support database, 2020

Fossil fuel subsidies by fuel type

USD in 2019



Over the past decade (2010-2020), Saudi Arabia's fossil fuel subsidies have generally decreased, reaching a value of USD 17.0bn in 2020. Over this period, most of the subsidies were directed to support the production and consumption of petroleum, followed by support for the consumption of fossil-fuelled electricity. These estimates are for consumption subsidies alone, obtained adopting the price-gap approach (unlike the data provided for the other G20 countries in this report). According to the Energy Policy Tracker data, during 2020 Saudi Arabia pledged at least USD 5.6bn to fossil fuel energy as part of its energy-related funding commitments and COVID-19 economic response. This commitment mainly consists of the state-owned enterprise Saudi Aramco's investment plans for the construction of the Hawiyah Unayzah underground gas storage site (USD 1.8bn) and for the development of the Jafurah unconventional gas field in the Eastern Province (USD 3.5bn).

Energy Policy Tracker, 2021; OECD-IEA Fossil Fuel Support database, 2020
Due to rounding, some graphs may sum to slightly above or below 100%



CORONAVIRUS RESPONSE AND RECOVERY

In response to COVID-19, the Saudi government introduced electricity subsidies – amounting to USD 240m (as of 12 August 2021) for the commercial, industrial and agricultural sectors. Further, at the start of the pandemic, the government reduced the sales price of transport fuels by about 50% to maintain below-the-market fuel prices, benefitting the oil and gas industry. By May 2021, prices had gradually surpassed pre-pandemic levels and, in July, the government introduced a ceiling on rising prices despite targets to eliminate fuel subsidies.

Muta et al., 2021; Paldaviute and Mirza, 2021

Carbon pricing and revenue

To date, Saudi Arabia does not have any explicit carbon pricing schemes, neither in the form of a national carbon tax nor an emissions trading scheme (ETS). An ETS is currently under consideration, but no clear plans or dates for implementation have yet been proposed. .

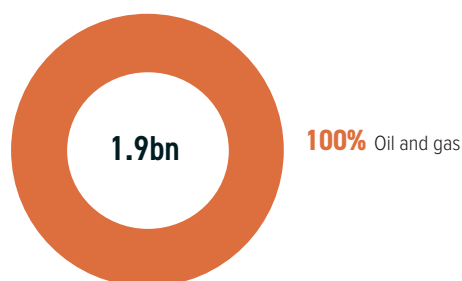
I4CE, 2021; OECD, 2020

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 fossil fuels

USD per annum (2018-19 average)



Between 2018 and 2019, Saudi Arabia provided an average of USD 1.9bn per year in public finance for the oil and gas sector. The country has no recorded public finance for coal. Saudi Arabia also has majority government-owned banks providing significant levels of public finance for energy, whose support is not captured in the data adopted for this analysis.

Oil Change International, 2020

Due to rounding, some graphs may sum to slightly above or below 100%

Provision of international public support

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.

FINANCIAL POLICY AND REGULATION

Financial policy and regulation

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.



Although no federal-level green financial policy or regulation has been identified, in July 2021 Saudi Arabia's sovereign wealth fund, the Public Investment Fund (PIF), asked the country's banks to help develop an environmental, social and governance (ESG) framework. The framework will allow the Kingdom of Saudi Arabia (KSA) to expand its funding base to ESG focused investors. The PIF was launched to develop a sustainable economy and achieve the Vision 2030.

Saba and Barbuscia, 2021

Nationally Determined Contribution (NDC): Finance

Conditionality	Not applicable
Investment needs	Not specified
Actions	Not mentioned
International market mechanisms	Not mentioned

ENDNOTES

Where referenced, “Enerdata, 2021” refers to data provided in July 2021. For more detail on the sources and methodologies behind the calculation of the indicators displayed, please download the Technical Note at: www.climate-transparency.org/g20-climate-performance/g20report2021

1 The ‘1.5°C compatible pathway’ is derived from global cost-effective pathways assessed by the IPCC’s SR15, selected based on sustainability criteria, and defined by the 5th-50th percentiles of the distributions of such pathways achieving the long-term temperature goal of the Paris Agreement. Negative emissions from the land sector and novel negative emissions technologies are not included in the assessed models, which consider one primary negative emission technology (BECCS). In addition to domestic 1.5°C compatible emissions pathways, the ‘fair share’ emissions reduction range would almost always require a developed country to provide enough support through climate finance, or other means of implementation, to bring the total emissions reduction contribution of that country down to the required ‘fair share’ level.

2 ‘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 LULUCF, which under the new IPCC 2006 Guidelines is integrated into Agriculture, Forestry, and Other Land Use (AFOLU).

3 The Decarbonisation Ratings assess the current year and average of the most recent five years (where available) to take account of the different starting points of different G20 countries.

4 The selection of policies rated and the assessment of 1.5°C compatibility are primarily informed by the Paris Agreement and the IPCC’s 2018 SR15. The table below displays the criteria used to assess a country’s policy performance.

5 The 1.5°C ‘fair-share’ ranges for 2030 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, 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 emissions technologies are expected to play a role from the 2030s onwards, compensating for remaining positive emissions. In order to maintain comparability across all countries, this report harmonises all data with PRIMAP, 2021 dataset to 2018. However, note that Common Reporting Format (CRF) data is available for countries which have recently updated GHG inventories. Where countries submitted updated NDC targets before August 2021, these have been analysed and included.

6 This indicator adds up emissions from domestic aviation and international aviation bunkers in the respective country. In this Country Profile, however, only a radiative forcing factor of 1 is assumed.

7 This indicator includes only direct energy-related emissions and process emissions (Scope 1) but not indirect emissions from electricity.

8 This indicator includes emissions from electricity (Scope 2) as well as direct energy-related emissions and process emissions (Scope 1).

On endnote 4.	 Low	 Medium	 High	 Frontrunner
Renewable energy in power sector	No policies 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
Coal phase-out in power sector	No targets and policies 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)
Phase out fossil fuel cars	No policies 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 fuel-based light-duty vehicles by 2035 worldwide
Phase out fossil fuel heavy-duty vehicles	No policies	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
Modal shift in (ground) transport	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
Near zero energy new buildings	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)
Energy efficiency in industry	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
Retrofitting existing buildings	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
Net zero deforestation	No policies or incentives 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

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