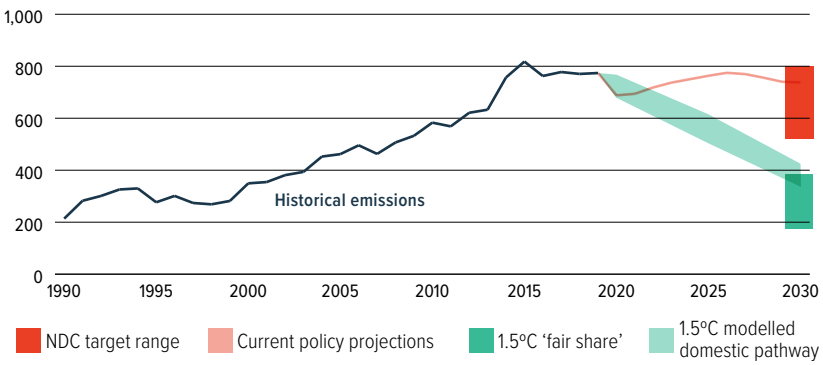
SAUDI ARABIA

Climate Transparency

CLIMATE TRANSPARENCY REPORT: COMPARING G20 CLIMATE ACTION **2022**

NOT ON TRACK FOR A 1.5°C WORLD

1.5°C compatible emissions pathway ($MtCO_2e$/year)[1]



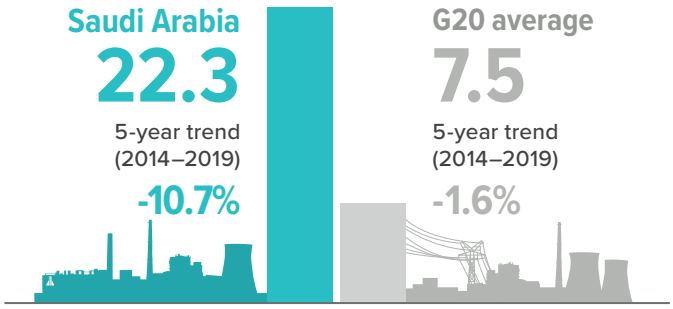
Saudi Arabia's updated NDC target range would increase emissions 416–562% above 1990 levels, or to approximately 524–799 $MtCO_2e$ (excl. LULUCF). To keep below the 1.5°C temperature limit, analysis by the 1.5°C Pathways Explorer shows Saudi Arabia's emissions would need to be around 347 $MtCO_2e$ by 2030, leaving an ambition gap of at least 177 $MtCO_2e$.

When compared with its 1.5°C 'fair share' contribution, Saudi Arabia would need to strengthen its unconditional target and policies to be in line with the Paris Agreement's 1.5°C warming limit.

Climate Action Tracker, 2022a, 2022b; Climate Analytics, 2022; Gütschow et al., 2021

PER CAPITA GREENHOUSE GAS (GHG) EMISSIONS ABOVE G20 AVERAGE

tCO_2e/capita[2] in 2019



Saudi Arabia's per capita emissions are 3 times the G20 average. Total per capita emissions have decreased by 10.7% from 2014 to 2019.

Gütschow et al., 2021; World Bank, 2022

RECENT DEVELOPMENTS

Saudi Arabia has opposed more ambitious text, particularly in reference to the phase-out of fossil fuels, in UN climate negotiations.

Ahead of COP26, **Saudi Arabia announced its net zero by 2060 target;** however, the scope and accounting of this target is very unclear.

Saudi Arabia aims to double the capacity of renewable energy tenders this year and in 2023, and has 7.1 GW already tendered and expected online in the next few years.

KEY OPPORTUNITIES FOR ENHANCING CLIMATE AMBITION

Commit to phasing out fossil fuel consumption and production and reducing emissions without reliance on unproven carbon capture technologies.

Saudi Arabia's new hydrogen strategy has the potential to decarbonise the Kingdom's economy and exports. **Prioritise the production of green hydrogen rather than continuing to rely on fossil fuels.**

Submit an updated NDC with stronger targets and improved transparency, including defined baseline emissions, and improve transparency of assumptions for the announced net zero by 2060 target.

Contents

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

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REDUCING EMISSIONS FROM

ENERGY USED:
- in the **power sector** 8
- in the **transport sector** 10
- in the **buildings sector** 12
- in the **industrial sector** 13

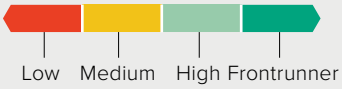
NON-ENERGY USES:
- in **land use** 14
- in **agriculture** 14

Legend

Trends show developments over the past five years for which data are available. A red exclamation mark indicates negative trends from a climate protection perspective.

Decarbonisation Ratings[3] assess a country's performance compared to other G20 Members. A high score reflects a relatively good effort from a climate protection perspective but is not necessarily 1.5°C compatible.

Policy Ratings[4] 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

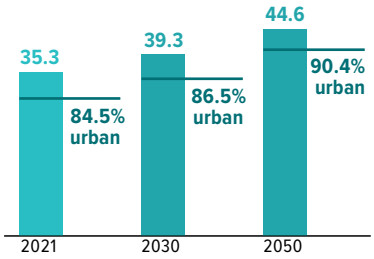
The Human Development Index (HDI) reflects life expectancy, level of education, and per capita income. Saudi Arabia ranks very high.

0.86 very high

Data for 2019. UNDP, 2020

Population and urbanisation projections

(in millions)

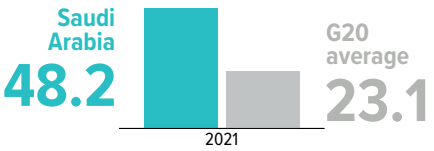


Saudi Arabia's population is projected to increase by 26% by 2050, and become more urbanised. Population growth and urbanisation has put a strain on resources, which will likely be exacerbated by climate change.

United Nations, 2018; World Bank, 2022

Gross Domestic Product (GDP) per capita

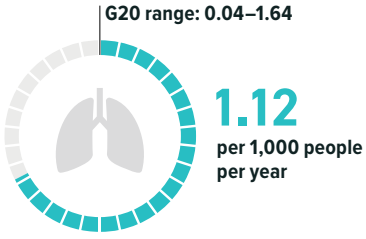
(thousand PPP constant 2015 international $ per person) in 2021



World Bank, 2021

Death rate attributable to ambient air pollution

(death rate per 1,000 population per year, age standardised) in 2019



Over 18,000 people die in Saudi Arabia every year due to stroke, heart disease, lung cancer and chronic respiratory diseases as a result of outdoor air pollution. This is one of the higher levels in the G20.

Institute for Health Metrics and Evaluation, 2020

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". Economic diversification is particularly crucial as oil revenues fund the large share of public sector employment and the provision of many social services. 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, which sends a somewhat mixed signal about the Kingdom's future trajectory.

Fair Square, 2020; General Authority for Statistics, 2022; Government of Saudi Arabia, 2015; Human Rights Watch, 2021; Kabbani and Mimoune, 2021; Kingdom of Saudi Arabia, 2016; Robinson, 2021

ADAPTATION

Paris Agreement: Increase the ability to adapt to the adverse effects of climate change and foster climate resilience and low-GHG development.

In October 2020, a wildfire in the Asir region threatened high value juniper woodlands. Wildfire impacts on vegetation differ across tree species, affecting recovery and the services they provide.

Between 1979–2018, average summer temperatures in the capital Riyadh increased by 2.8°C, and the whole year average rose by 2.3°C. This increased the demand for cooling in buildings and industry, in turn driving higher demand for electricity.

By 2050 there will be a possible reduction in rainfall of about 20% in the northern areas where most of the groundwater reserves are concentrated, with impacts on their potential to recharge.

ADAPTATION NEEDS

Impacts of a changing climate

Exposure to warming

1.4°C
Higher

Between 2017 to 2021, the average summer temperatures experienced by people in Saudi Arabia were 1.4°C higher than the 1986–2005 average global mean temperature increase of 0.3°C.

Changes in the ability to work due to exposure to excessive heat

1.2bn **Labour hours lost**
241% **increase**

In 2021, heat exposure in Saudi Arabia led to the loss of 1.2 billion potential labour hours, a 241% increase from 1990–1999.

Loss of earnings from heat-related labour capacity reduction

8.4bn **Loss in labour capacity (USD)**
1% **of GDP**

Extreme heat can make it unbearable or even dangerous to work in a range of economically important sectors. The potential income loss in 2021 – in the service industry, manufacturing, agriculture, and construction sectors – from labour capacity reduction due to extreme heat was USD 8.4bn in Saudi Arabia, or 1% of its GDP.

Romanello et al., 2022; World Meteorological Organization, 2022

Exposure to future impacts at 1.5°C warming and higher

Different levels of global warming are projected to have a wide range of impacts of varying severity across the world. The percentages at 1.5°C are calculated as an increase/decrease from the reference period of 1986–2006. Using the projected impacts at 1.5°C of warming as a reference, we compare impacts that may occur at higher levels of warming.

Climatic	**At 2°C**	**At 2.5°C**	**At 3°C**
Local **precipitation**: -+11.6% at 1.5°C warming	0.6 times	1 time	1.3 times

In Saudi Arabia, local precipitation is projected to increase by 11.6% from the 1986–2006 reference period average if global temperature rises by up to 1.5°C. Under a 3°C warming scenario, precipitation is projected to increase by 1.3 times more than the increase projected at 1.5°C.

Fresh water	**At 2°C**	**At 2.5°C**	**At 3°C**
Surface run-off: +47.1% at 1.5°C warming	0.9 times	0.4 times	0.6 times
River discharge: +23.2% at 1.5°C warming	1.4 times	1.9 times	2.6 times
Total **soil moisture content:** -0.6% at 1.5°C warming	2.9 times	5.9 times	3.7 times

In Saudi Arabia, the percentage of surface run-off and river discharge is projected to increase by 47% and 23% from the 1986–2006 average, respectively, if global temperature rises by up to 1.5°C. This increase of surface run-off and river discharge would be 0.6 and 2.6 times greater, respectively, at 3°C of warming. Under 1.5°C of warming, total soil moisture content would decrease by 0.6%. This decline would be 3.7 times greater under a 3°C warming scenario.

Hazards	At 2°C	At 2.5°C	At 3°C
Number of people annually exposed to **heatwaves:** 1.1 million at 1.5°C warming	1.4 times	1.4 times	1.3 times
Number of people annually exposed to **crop failures**: 588 at 1.5°C warming	1.3 times	2.4 times	4.0 times

The number of people annually exposed to hazards is expected to rise as the temperature increases. For example, the number of people annually exposed to heatwaves in Saudi Arabia is projected to be approximately 1.1 million more people exposed annually during the reference period, at 1.5°C of warming, and 1.4 times greater if warming increases to 2°C. At 1.5°C of warming, crop failures are projected to affect 588 more people than were affected between 1986–2006, while at 3°C even that increase in people is projected to be multiplied by 4 times.

Economic	At 2°C	At 2.5°C	At 3°C
Annual expected damage from **river flood:** +152.2% at 1.5°C warming	0.2 times	0.4 times	-0.1 times
Labour productivity due to heat stress: -4.2% at 1.5°C warming	1.6 times	2.2 times	2.8 times

The annual expected damage from river flooding under a 1.5°C scenario will increase by 152%. The labour productivity is projected to reduce by 4.2% from the 1986–2006 average under 1.5°C of warming, and this decrease would be 2.8 times larger at 3°C of warming.

For further assessments of impacts under different warming scenarios, and a detailed explanation of the methodology, go to https://climate-impact-explorer.climateanalytics.org

Climate Analytics, 2021

ADAPTATION POLICIES

National Adaptation Strategies

No adaptation policy for Saudi Arabia

Nationally Determined Contribution (NDC): Adaptation

TARGETS

Not mentioned

ACTIONS

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

MITIGATION

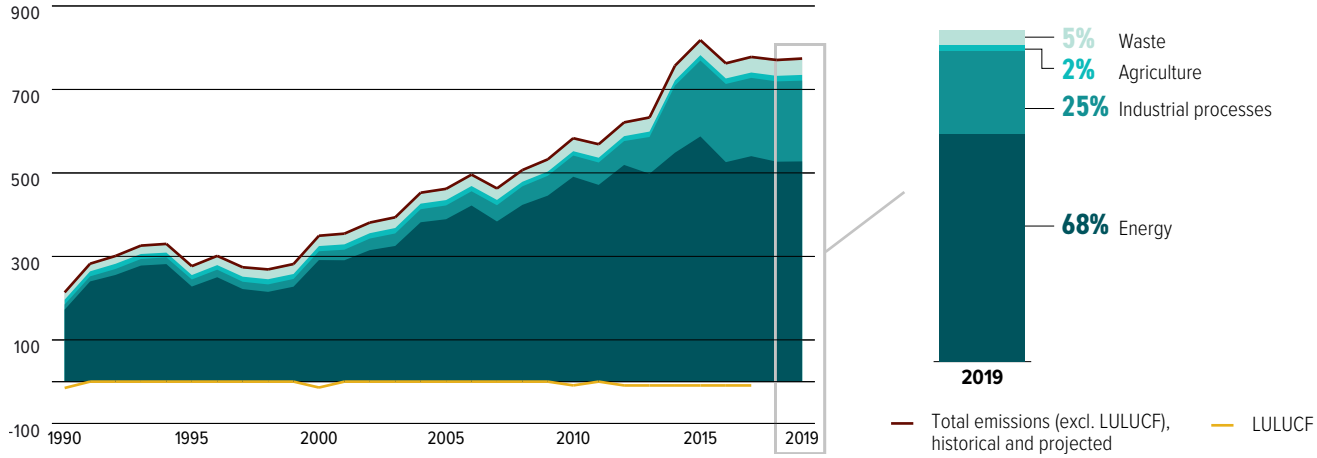
Paris Agreement: Hold the increase in the global average temperature to well below 2°C above pre-industrial levels and pursue efforts to limit to 1.5°C, recognising that this would significantly reduce the risks and impacts of climate change.

EMISSIONS OVERVIEW

Saudi Arabia's total **greenhouse gas emissions (excl. LULUCF) have increased by 262%** (1990–2019). In the same period, its total methane emissions (excl. LULUCF) have increased by 116%.

GHG emissions across sectors[5]

Total sectoral GHG emissions ($MtCO_2e$/year)

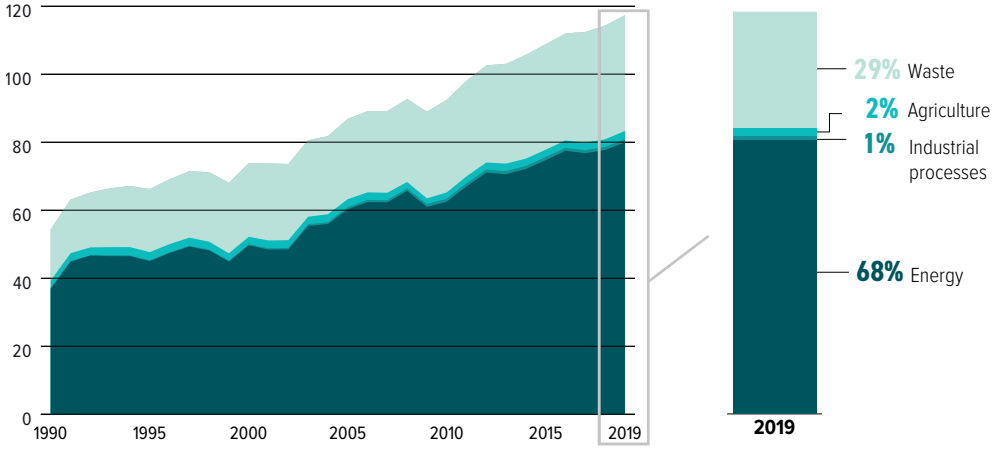


Saudi Arabia's GHG emissions (excl. LULUCF) increased by 262% between 1990 and 2019 to 774 $MtCO_2e$/yr. When considered by category, increases were largely due to a sustained increase in energy and industry-related emissions since 1990, but growth in emissions was seen in all sectors over the same timeframe.

Gütschow et al., 2021

Methane emissions by sector

Total CH_4 emissions ($MtCO_2e$/year)



Saudi Arabia signed the Global Methane Pledge at COP26 in November 2021.

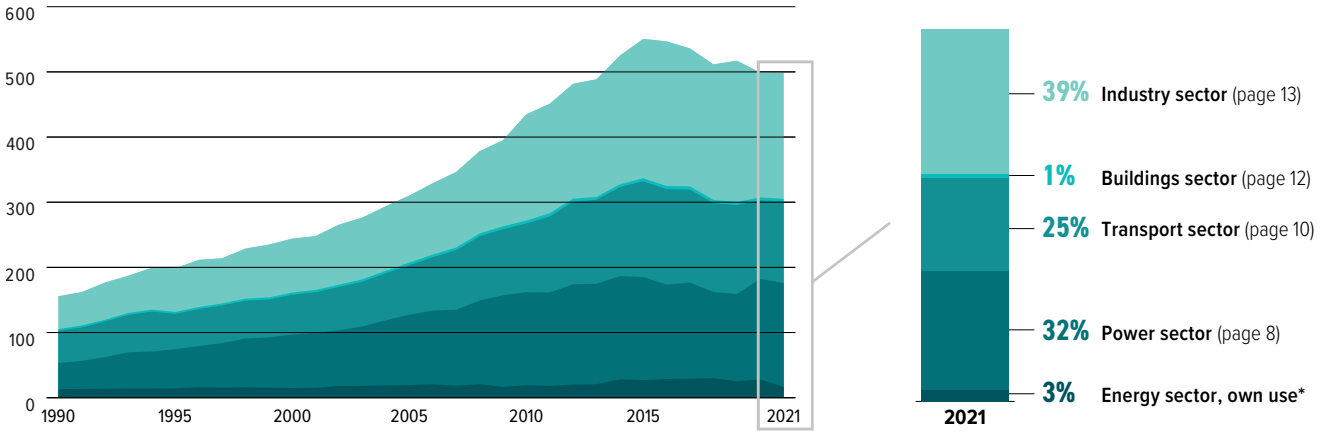
Participating countries pledged to undertake voluntary actions to contribute to a collective reduction of global methane emissions by at least 30% from 2020 levels by 2030. Further scrutiny of plans and implementation will be required.

Methane is a potent, though short-lived, greenhouse gas, accounting for an estimated third of global warming. Saudi Arabia's methane emissions (excl. LULUCF) increased by 116% between 1990 and 2019 to 117 $MtCO_2e$/yr. The majority of Saudi Arabia's methane emissions came from the energy and waste sectors in 2019. Those two sectors have increased significantly from 1990 to 2019, while industry and agriculture remained stable.

Climate and Clean Air Coalition, 2021; Gütschow et al., 2021

Energy-related CO_2 emissions by sector

Annual CO_2 emissions ($MtCO_2$/year)



The largest driver of overall greenhouse gas emissions are CO_2 emissions from fuel combustion. In Saudi Arabia, emissions have been increasing since 1990. At 39%, the industry sector is the largest contributor, followed by the electricity generation and transport sectors with 32% and 25%, respectively.

Enerdata, 2022

** Includes energy-related CO_2 emissions from extracting and processing fossil fuels.*

ENERGY OVERVIEW

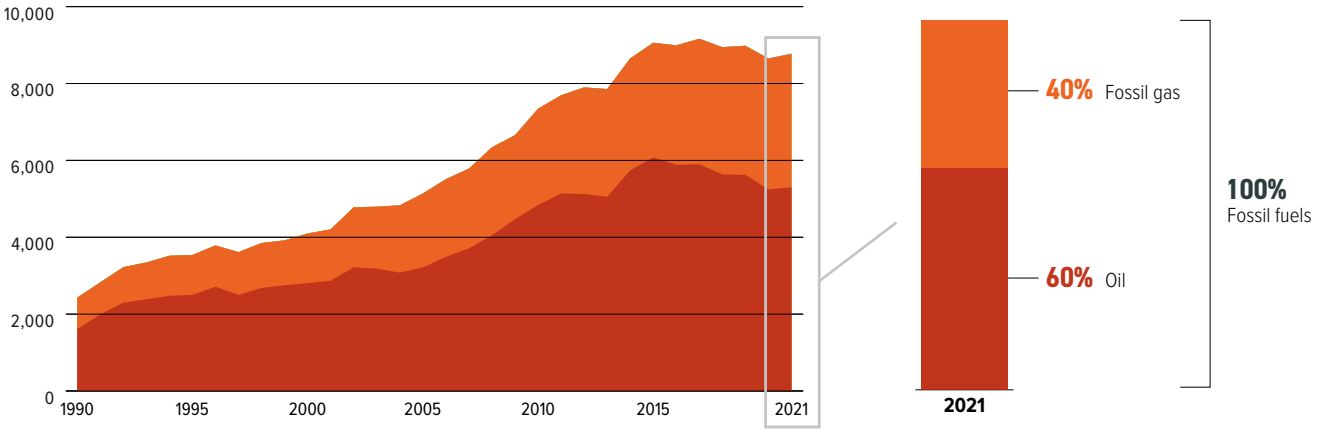
Saudi Arabia's energy mix is entirely dominated by fossil fuels (99.9%), one of the highest levels in the G20: the G20's average fossil fuel share of the energy mix is 81%. **The share of renewable energy is almost zero:** in 2021, it constituted 0.1% of total primary energy consumption.

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.

Rogelj et al., 2018

Energy mix

Total primary energy supply (PJ)

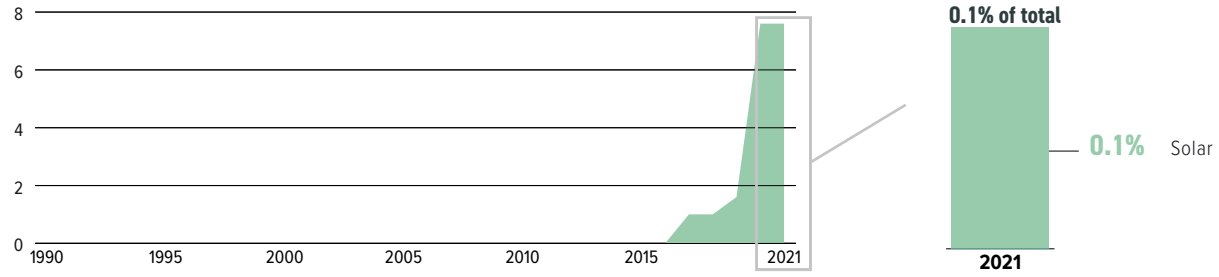


This graph shows the fuel mix for all energy supply, including energy used not only for electricity generation, heating and cooking, but also for transport fuels. Fossil fuels (oil and gas) make up 99.9% of the Saudi Arabian energy mix, the highest level in the G20. Increased energy supply was mainly driven by increased fossil gas and oil use since 1990. Solar energy started to come online in 2020, but renewables remain a negligible share of the energy mix.

Enerdata, 2022

Solar, wind, geothermal and biomass development

As a share of total primary energy supply (TPES) (PJ)

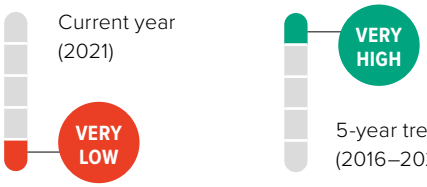


Solar is the only renewable energy source in Saudi Arabia. It accounts for 0.1% of Saudi Arabia's total energy supply and is one of the G20's lowest levels: the G20 average is 7.5%. The share in total energy supply has increased by around 1,573% in the last 5 years (2016–2021), from zero in 2015.

Enerdata, 2022

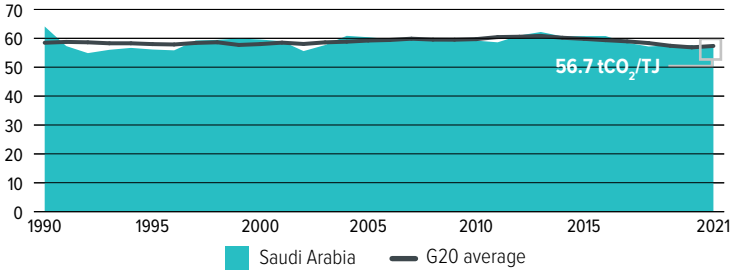
Note: Large hydropower and solid fuel biomass in residential use are not reflected due to their negative environmental and social impacts.

Decarbonisation: a high rating indicates more effort to decarbonise compared to other G20 Members



Carbon intensity of the energy sector

Tonnes of CO_2 per unit of TPES (tCO_2/TJ)



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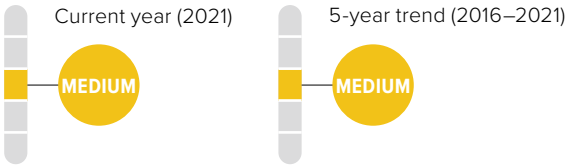
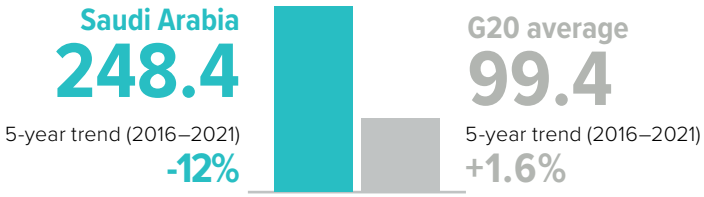


Carbon intensity of the energy supply in Saudi Arabia has remained relatively constant since 1990, but since 2013 has begun to decline as oil use in the energy mix has decreased slightly. Saudi Arabia's carbon intensity is close to the G20 average, but is declining slightly faster.

Enerdata, 2022

Energy supply per capita

TPES per capita (GJ/capita) in 2021

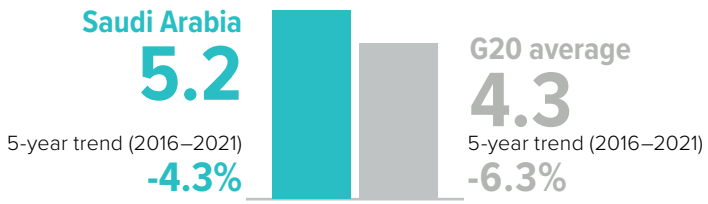


The level of energy supply per capita is closely related to economic development, climatic conditions and the price of energy. In 2021, energy supply per capita in Saudi Arabia was 248.4 GJ, well above the G20 average of 99.4 GJ. However, supply has decreased by 12% between 2016–2021, whereas the G20 average increased by 1.6% over the same period.

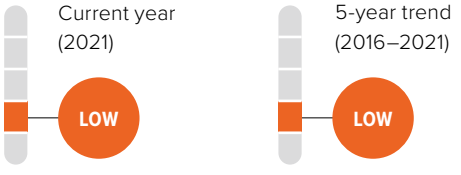
Enerdata, 2022; World Bank, 2022

Energy intensity of the economy

(TJ/million US$2015 GDP) in 2021



Decarbonisation: a high rating indicates more effort to decarbonise compared to other G20 Members



This indicator quantifies how much energy is used for each unit of GDP. This is closely related to the level of decarbonisation, efficiency achievements, climatic conditions or geography. Saudi Arabia's energy intensity is higher than the G20 average and has been decreasing at the slightly lower rate of 4.3% (2016–2021) as compared to the G20 average decrease.

Enerdata, 2022; World Bank, 2021

POWER SECTOR

Emissions from energy used to make electricity and heat

Power generation produced **32% of Saudi Arabia's energy-related CO_2 emissions.** In 2021, 99% of the fuels used to make electricity were fossil fuels.

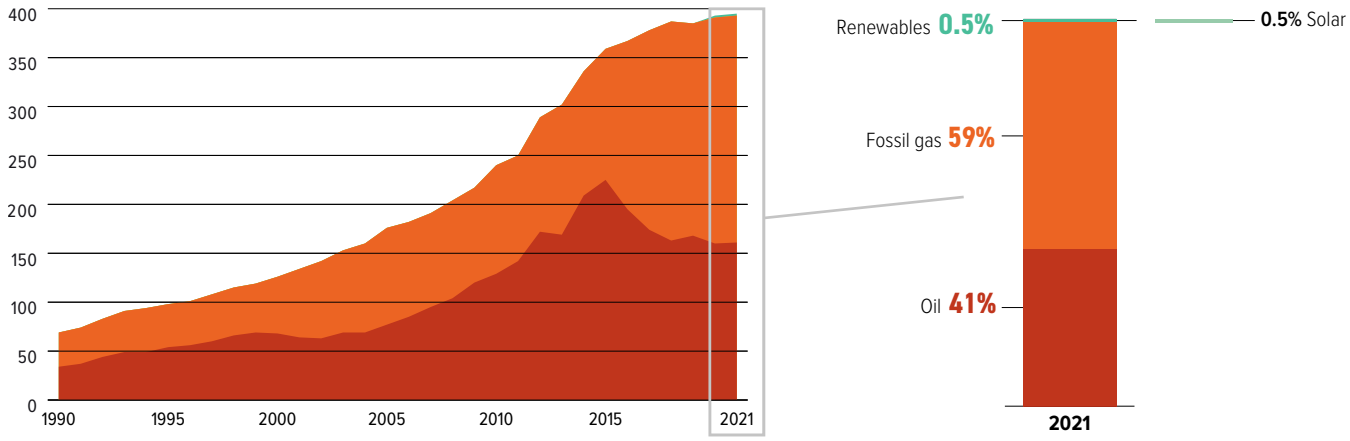
Power generation's share of energy-related CO_2 emissions in 2021: **32%**

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.

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

Electricity generation mix

Gross power generation (TWh)

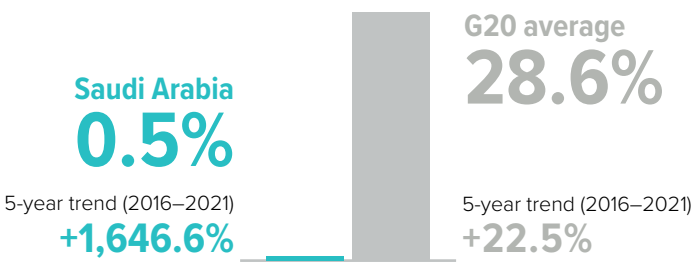


Saudi Arabia generated 99% of its electricity from fossil fuels in 2021. The dominance of oil in the power sector peaked in 2015 and has declined since, to be largely replaced with fossil gas. The share of renewable energy in Saudi Arabia's power sector has been increasing but is still negligible, accounting for approximately 0.5% of the power mix in 2021 – all of it solar. This is very low compared to the G20 average of 29%.

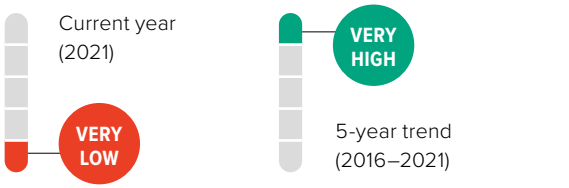
Enerdata, 2022

Share of renewables in power generation

(incl. large hydro) in 2021



Decarbonisation: a high rating indicates more effort to decarbonise compared to other G20 Members

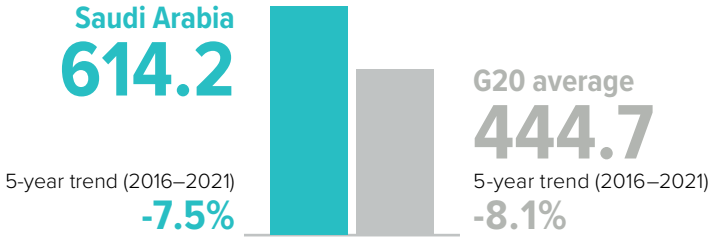


Note that solar contributed just 0.04% to power generation in 2016.

Enerdata, 2022

Emissions intensity of the power sector

(gCO_2/kWh) in 2021



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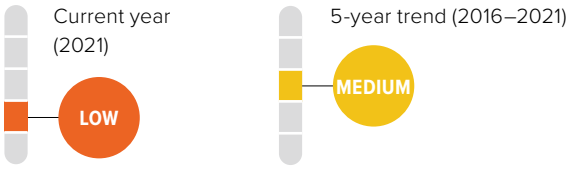
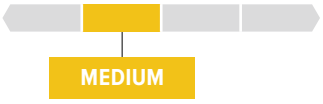


For each kilowatt hour of electricity, 614.2 g of CO_2 are emitted in Saudi Arabia. The emissions intensity has only dropped marginally because the use of fossil fuels for power generation has barely declined (still 99% of the power mix).

Enerdata, 2022

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 tripled its renewable energy capacity target – from 9.5 GW by 2023 to 27.3 GW by 2024 with 58.7 GW installed capacity by 2030. While actual implementation has been slow, with capacity in 2021 at about 700 MW, 7 solar Power Purchase Agreements (PPAs) with a total capacity of 3 GW were signed in 2021.

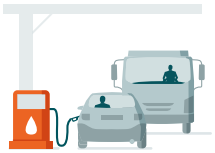
ACWA Power, 2021; Government of Saudi Arabia, 2021; Kiyasseh, 2022; IRENA, 2022; Power Technology, 2021; Vivid Economics, 2021

Coal phase-out in the power sector

Not applicable Saudi Arabia does not use coal to generate power

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 fully decarbonised.

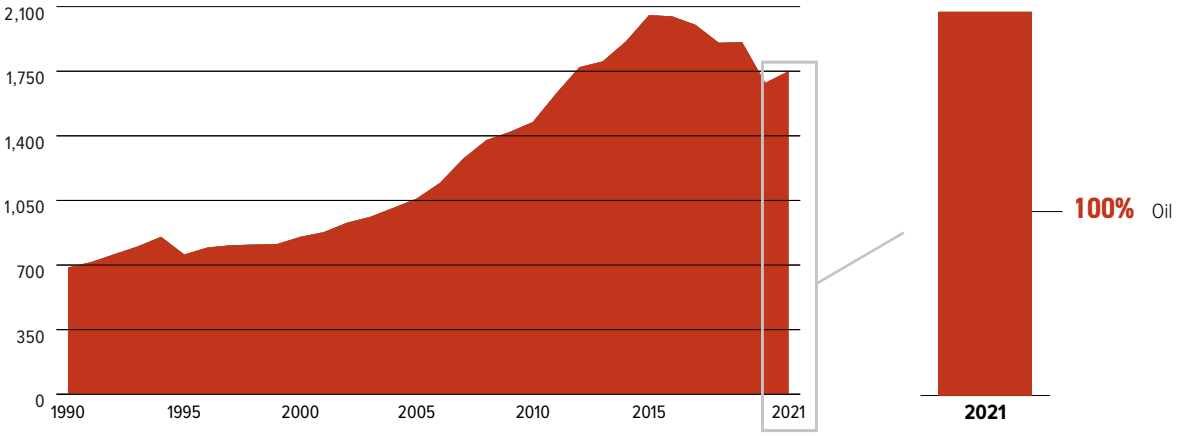
Transport's share of energy-related CO_2 emissions in 2021: **25.1%** Direct

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

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

Transport energy mix

Final energy consumption by source (PJ/year)

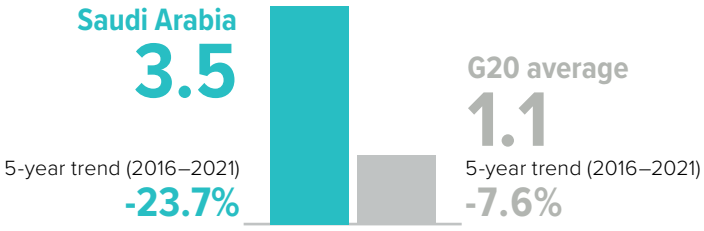


Electricity and biofuels do not feature in the energy mix for transport.

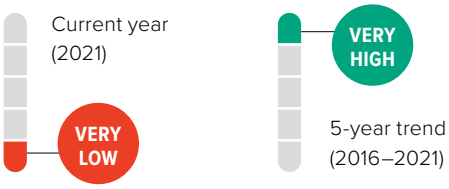
Enerdata, 2022

Transport emissions per capita

(excl. aviation) (tCO_2/capita) in 2021



Decarbonisation: a high rating indicates more effort to decarbonise compared to other G20 Members

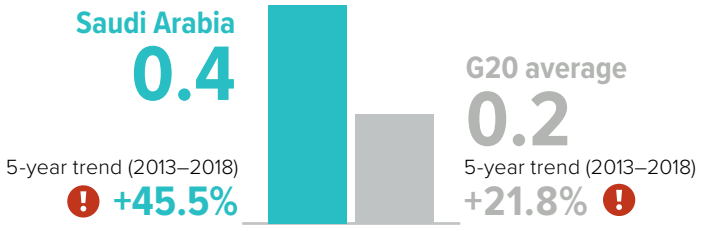


Per capita emissions in 2021 and the 5-year trend have been impacted by COVID-19 pandemic response measures and resulting economic slowdowns. For a discussion of broader trends in the G20 and the rebound of transport emissions in 2022, please see the Highlights Report at www.climate-transparency.org

Enerdata, 2022; World Bank, 2022

Aviation emissions per capita[6]

(tCO_2/capita) in 2018



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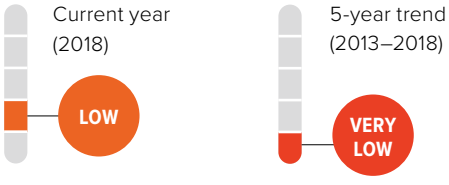


Enerdata, 2022; IEA, 2021a; World Bank, 2022

Motorisation rate

135.4
vehicles per 1,000 inhabitants in 2019

Enerdata, 2022

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

No data available for Saudi Arabia

Modal split passenger transport

(% of passenger-km): road, rail and air

No data available for Saudi Arabia

Modal split freight transport

(% of tonne-km): road, rail

No data available for Saudi Arabia

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, 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. In 2022, the government announced plans to build three EV assembly plants. Under the Red Sea tourism project, an agreement has been signed to have the entire project's transportation system fuelled with biofuels. The Kingdom has been exploring the suitability of hydrogen vehicles and, in 2022, published regulations on these vehicles.

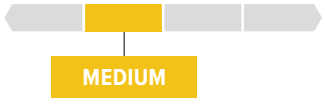
Aoki, 2022; Arab News, 2022; Reuters, 2022; Sheldon and Dua, 2019; Utilities Middle East, 2019

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 would introduce regulations to improve fuel economy by enforcing anti-idling and aerodynamics. The aerodynamics regulations were slated for publication in 2019, but have not been yet. The second initiative was aimed at accelerating the retirement of inefficient HDVs.

SEEC, 2018

Modal shift in (ground) transport

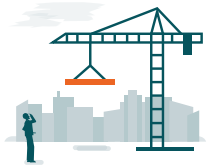


The Vision 2030 sets out qualitative objectives to increase the use of public transport and improve the efficiency of railways. In July 2021, the government announced plans to invest USD 147bn in the transport sector by 2030, but this includes significant plans to expand air travel (passenger and freight). 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 was expected to be operational in 2021.

Oxford Business Group, 2020; Kingdom of Saudi Arabia, 2016; Nereim, 2021; Saudi Gazette, 2022

BUILDINGS SECTOR

Emissions from energy used to build, heat and cool buildings



Direct and indirect emissions from the buildings sector in Saudi Arabia account for 0.8% and 24% of total energy-related CO_2 emissions respectively. Per capita emissions from the buildings sector are more than twice the G20 average.

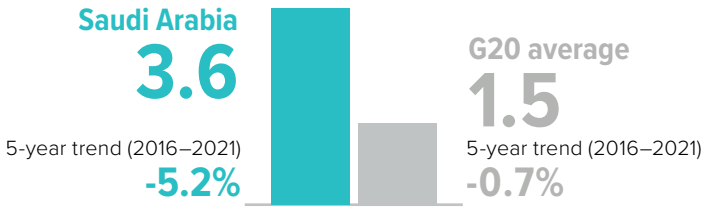
Buildings sector's share of energy-related CO_2 emissions in 2021: **0.8%** Direct **24%** Indirect

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.

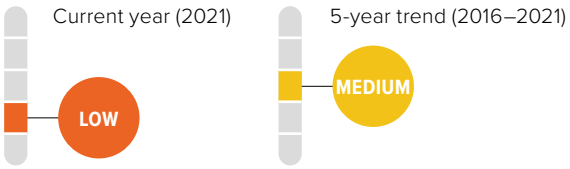
Climate Action Tracker, 2020; Rogelj et al, 2018

Buildings sector emissions per capita

incl. indirect emissions (tCO_2/capita) in 2021



Decarbonisation: a high rating indicates more effort to decarbonise compared to other G20 Members

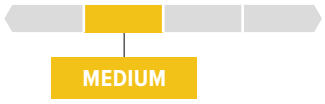


Buildings emissions occur directly (burning fuels for heating, cooking, etc) and indirectly (from grid-electricity for air conditioning, appliances, etc.). Buildings-related emissions per capita were more than twice the G20 average as of 2021. This reflects the high fossil fuel share of the electricity mix. Between 2016–2021, buildings sector emissions per capita declined by 5.2%, faster than the G20 average decrease of 0.7%.

Enerdata, 2022; World Bank, 2022

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 had over 3,000 green registered and certified projects.

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

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 retrofitting public buildings and facilities. Tarshid has completed several retrofit projects, including renovating buildings in the Qassim region, with expected savings of 2.9m kWh/year. In 2019, the Saudi Energy Efficiency Centre launched the full rollout of its High Efficiency Air Conditioning Initiative to boost production and adoption of high efficiency air conditioners.

SEEC, 2021; Tarshid, 2021, 2022

INDUSTRY SECTOR

Emissions from energy use in industry

Direct and indirect emissions from Saudi Arabian industry make up 38.7% and 5.1% of energy-related CO_2 emissions, respectively. Saudi Arabia lacks effective policies to increase the energy efficiency of the industry sector and has no effective policies to reduce emissions or decarbonise the sector.

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

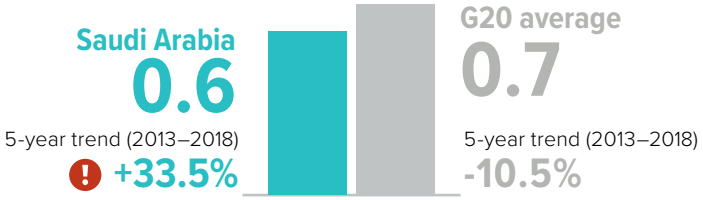
Rogelj et al., 2018

Industry sector's share of energy-related CO_2 emissions in 2021:

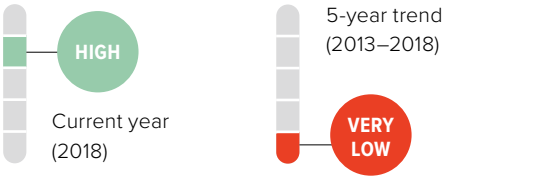
38.7% Direct **5.1%** Indirect

Industry emissions intensity[7]

($kgCO_2e$/USD2015 GVA) in 2018



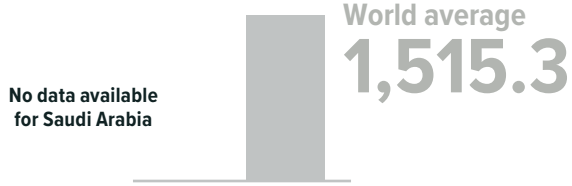
Decarbonisation: a high rating indicates more effort to decarbonise compared to other G20 Members



Enerdata, 2021; World Bank, 2022

Carbon intensity of steel production[8]

($kgCO_2$/tonne product) in 2019



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

Enerdata, 2022; World Steel Association, 2021

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, but there is no information available on progress. The Saudi Industrial Development Fund provides soft loans for energy-efficiency-related projects in industry. As part of the Saudi Green Initiative's target to reduce emissions, the Kingdom aims to implement new energy efficiency standards for some sectors, including water desalination.

Howarth et al., 2020; Saudi Green Initiative, 2022a

LAND USE SECTOR

Emissions from land use change and forestry

Global deforestation needs to be halted and changed to net CO_2 removals by around 2030.

Rogelj et al., 2018

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

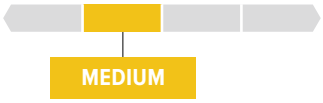
Annual forest expansion, deforestation and net change

Forest area change in 1,000 ha/year

No data available for Saudi Arabia

POLICY ASSESSMENT

Target for net zero deforestation



In 2021, Saudi Arabia announced two iniatives. The Saudi Green Initiative includes planting 10 billion trees, which it estimates is equivalent to rehabilitating roughly 40 million hectares of degraded lands and a twelve-fold increase of current tree cover. It has established 24 projects to achieve this goal. The second, 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.

Government of Saudi Arabia, 2021; Lo, 2021; Saudi Green Initiative, 2022b

AGRICULTURE SECTOR

Emissions from agriculture

Methane emissions 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).

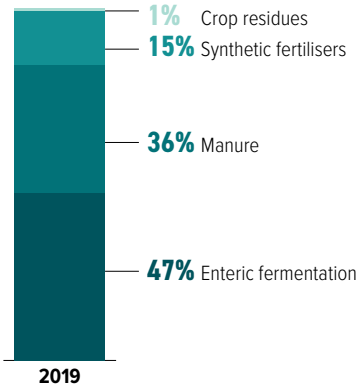
Rogelj et al., 2018

Saudi Arabia's agricultural emissions are primarily from the digestive processes and manure of livestock (mainly cattle). A 1.5°C compatible pathway would require adapting livestock diets, making dietary changes and improving manure storage and handling.

Emissions from agriculture

excluding energy emissions, in 2019

6.63
$MtCO_2e$ in 2019



In Saudi Arabia, the largest sources of GHG emissions in the agriculture sector are enteric fermentation (47%), livestock manure (36%), and synthetic fertilisers (15%).

Adapting livestock diets, improving manure storage and handling, and reducing or more efficiently using synthetic fertilisers could help reduce emissions from this sector.

FAO, 2022

MITIGATION: TARGETS AND AMBITION

The science from the IPCC on the risks of exceeding 1.5°C warming is clear. The UN science body has projected that to keep the 1.5°C goal alive, the world needs to roughly halve emissions by 2030.

However, despite the Glasgow Climate Pact (1/CMA.3) agreement to "revisit and strengthen" 2030 targets this year, progress on more ambitious targets has stalled. Without far more ambitious government action, the world is heading to a warming of **2.4°C with the current 2030 targets** and even higher warming **of 2.7°C with current policies.**

Climate Action Tracker, 2021a, 2022c; IPCC, 2022; UNFCCC, 2021

AMBITION: 2030 TARGETS

Nationally Determined Contribution: Mitigation

TARGETS

Reducing, avoiding, and removing GHG emissions by 278 million tonnes of CO_2e annually by 2030: 2019 designated as the base year.

ACTIONS

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

Climate Action Tracker (CAT) evaluation of targets and actions

Critically insufficient	**Highly insufficient**	Insufficient	Almost sufficient	1.5°C Paris Agreement compatible

The CAT evaluates and rates several elements of climate action: policies and actions, targets, and a country's contribution to climate finance (where relevant) and combines these into an overall rating.

The CAT rates Saudi Arabia's climate targets and policies as "highly insufficient". The "highly insufficient" rating indicates that Saudi Arabia's climate policies and commitments reflect minimal to no action, leading to rising rather than falling emissions, and are not at all consistent with the Paris Agreement's 1.5°C temperature limit. Saudi Arabia's 2030 emissions reduction target is rated as "critically insufficient" when compared with its 'fair share' contribution to climate action, and is consistent with more than 4°C of warming. The 2030 target is rated as "insufficient" when compared to modelled domestic pathways, downscaled from global least-cost scenarios. Saudi Arabia's policies could lead to its emissions peaking in the second half of this decade, but still only in line with 2°C to 3°C warming. Saudi Arabia still needs to strengthen its target for emissions reductions and implement additional policies to get a rating aligned to the Paris Agreement.

This CAT analysis was updated in November 2021.
For the full assessment of the country's targets and actions, and the explication of the methodology, see www.climateactiontracker.org

Climate Action Tracker, 2022a

AMBITION: LONG-TERM STRATEGIES

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

Status	No long-term strategies submitted
Net zero target	2060
Interim steps	
Sectoral targets	

FINANCE

Paris Agreement: 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 by adopting the 'price-gap' approach (unlike the data provided for the other G20 Members in this report).

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

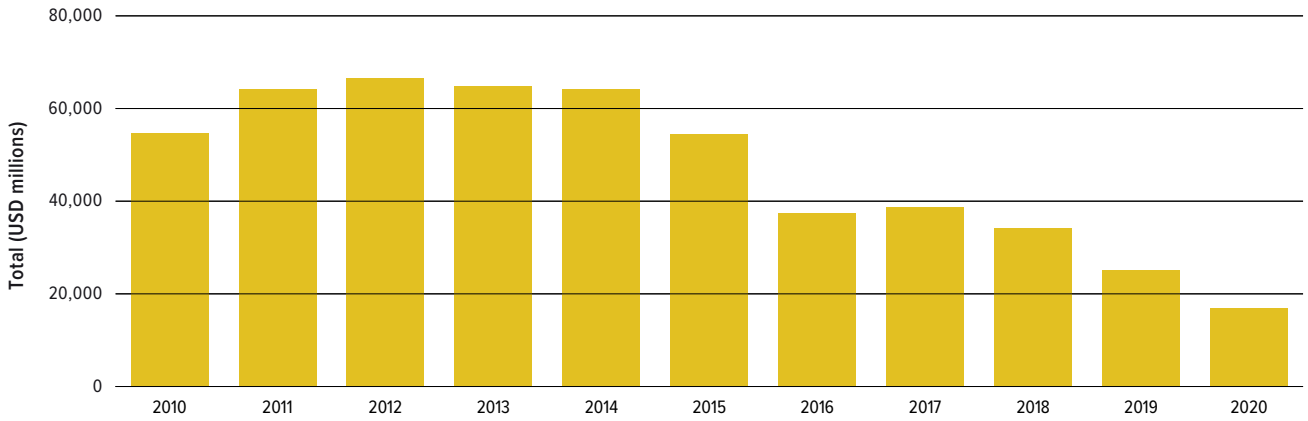
Rogelj et al., 2018

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 relative to national budgets

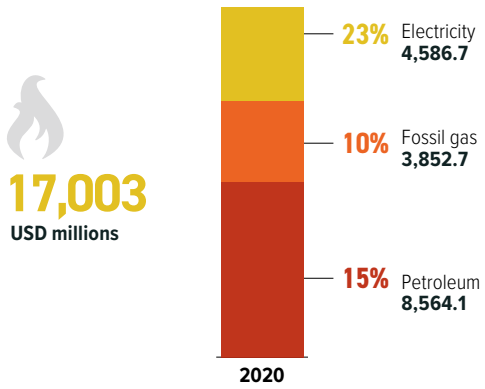
(USD millions)



OECD-IEA Fossil Fuel Support Database, 2022

Fossil fuel subsidies by fuel type

(USD millions) in 2020



Fossil fuel subsidies in Saudi Arabia have decreased over the past decade, reaching a low of USD 17bn in 2020. Over this period, half of the subsidies were directed at supporting the consumption of petroleum, with 27% allocated to electricity and the rest to fossil gas. Estimates by the OECD-IEA database use the 'price-gap' approach comparing end-user prices, whereas the inventory approach was used to calculate data for the G20 Members – see the Technical Note for further information.

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, 2022; OECD-IEA Fossil Fuel Support Database, 2022

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 of an emissions trading scheme (ETS). An ETS is currently under consideration, but no clear plans or dates for implementation have been proposed yet.

I4CE, 2022

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.

Saudi Arabia has taken almost no steps towards green regulation nor aligning its financial system with its climate goal of net zero by 2060. However, in 2022, its Public Investment Fund (PIF) launched a Green Finance Framework to build a green bond market to support its Vision 2030 objectives of developing non-oil GDP growth. These include developing 70% of Saudi Arabia's renewable energy target of 58.5 GW by 2030. The framework is aligned with the Green Bond Principles.

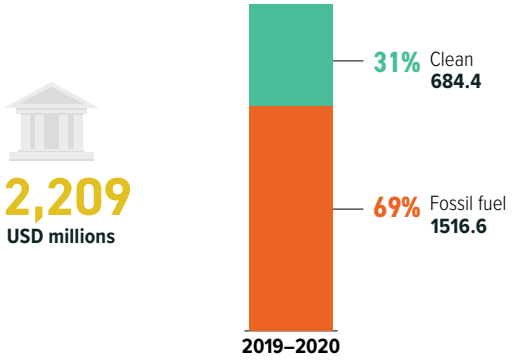
Strutt and Ghosh, 2022

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 Members 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 energy

USD millions (2019–2020 average)



Between 2019 and 2020, Saudi Arabia provided an average of USD 2.2bn in public finance per year to energy projects. Of this amount, 69% went to fossil fuels, primarily to oil and gas. The largest single support measure was an investment by the PIF in major oil companies, including BP, Shell and Total. Other significant investments include the acquisition for USD 1.3bn by the PIF of a 16.6% interest in ACWA Power in 2020, which runs renewable as well as fossil fuel projects.

ACWA Power, 2021; Oil Change International, 2022

Provision of international public support

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

Endnotes

For more detail about sources and methodologies, please download the CTR Technical Note at: www.climate-transparency.org/g20-climate-performance/g20report2022

Where referenced, "Enerdata, 2022" refers to data provided in July 2022 and, due to rounding, graphs may sum to slightly above or below 100%.

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) data tables, converted to the categories from the IPCC 1996 guidelines, in particular separating Agriculture from LULUCF, which under the 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 5 years (where available) to take account of the different starting points of different G20 Members.

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 Policy Assessment Criteria table below displays the criteria used to assess a country's policy performance.

5 In order to maintain comparability across all countries, this report harmonises all data with PRIMAP 2021 dataset to 2018. However, note that CRF data is available for countries which have recently updated GHG inventories.

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).

Policy Assessment Criteria

	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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