

aramco

Investing in growth
Innovating for sustainability

Aramco
Sustainability Report 2023

We are Aramco, one of the world's largest integrated energy and chemicals companies

Our approach to sustainability reporting

In our third Sustainability Report, we present how we integrate sustainability within our corporate strategy and operations; the material sustainability issues that impact our business and stakeholders; a summary of key initiatives; and our sustainability performance during 2023.

Sustainability for Aramco is about being a responsible corporate citizen environmentally, socially and economically. This is underpinned by our four focus areas (Climate change and the energy transition, Safe operations and people development, Minimizing environmental impact, and Growing societal value), where we elaborate on what sustainability means for Aramco and set our relevant ambitions, targets and metrics.

Reporting standards

The following sections of this report have been prepared with reference to and/or guidance from the following frameworks, standards, and guidelines:

- Reporting guidelines for our Environment, Social and Governance (ESG) disclosures: Ipeca;
- For measuring and reporting our greenhouse gas (GHG) emissions: Greenhouse Gas Protocol; and
- For reporting our health and safety performance metrics: Occupational Safety and Health Administration (OSHA) Standards and the American Petroleum Institute Recommended Practices.

Reporting boundaries, scope, and basis of preparation

This report contains data for the full year 2023 (January 1 – December 31). Where available, we have compared the 2023 performance with 2022 and 2021 data.

For clarity and transparency, the specific reporting boundaries of each metric for 2023, 2022, and 2021 data have been noted in detail on page 100 in the Data section of this report.

Acquisitions made during 2023 will not be reportable until after the first full year of operation. Therefore, acquisitions made during 2023 will be reportable from FY2025 onwards. Any wholly-owned sites that are not fully operational are excluded from reporting until effective data controls and systems are in place.

The basis of preparation on how we measure and report on the sustainability performance metrics that undergo external independent assurance can be found **online**.

SABIC and S-Oil's sustainability data are not in the scope of this report. Both subsidiaries are publicly listed and issue separate annual sustainability reports.

Internal controls and data validation

All figures in this report represent the latest available, internally validated data, unless specifically referenced. Some of the totals presented may reflect the rounding-down or rounding-up of subtotals.

Aramco's internal reporting systems capture and record the data used in this report. All data has been subject to internal validation, including data reviews by the reporting businesses and internal subject matter experts.

Third-party limited assurance

Third-party limited assurance has been sought against various key performance metrics, including GHG emissions, in accordance with the revised International Standard on Assurance Engagements 3000 (ISAE 3000 revised). Data that has undergone assurance has been referenced throughout the report. More information on assured data and the assurance statements can be found **online**.

Our vision

Aramco's vision is to be the world's preeminent integrated energy and chemicals company, operating in a safe, sustainable, and reliable manner.

Our mission

Aramco strives to provide reliable, affordable, and more sustainable energy to communities around the world, and to deliver value to its shareholders through business cycles by maintaining its preeminence in oil and gas production and its leading position in chemicals, aiming to capture value across the energy value chain and profitably growing its portfolio.

Contents

Overview

2023 at a glance	02
Our history	06
Chairman's message	08
President and CEO's message	09
Value of oil and gas	10
Positioning Aramco for the future	12
Our approach to sustainability	16
Our stakeholder engagement	20

Governance

94

Data

Our metrics	102
Abbreviations, terms, and glossary	107
Forward-looking statements	112

Our sustainability focus areas



Climate change and the energy transition

Page 22



Safe operations and people development

Page 50



Minimizing environmental impact

Page 64



Growing societal value

Page 78

Assured data

** External limited assurance symbol

The figures within this report have undergone external limited assurance in accordance to the ISAE 3000 (revised). The relevant information are marked with this symbol.

■ The assurance reports can be found **online** on the Sustainability section of our website.

2023 at a glance

Our business performance

Inputs

Operations		Financial	
Total hydrocarbon reserves¹ (billion boe)	Maximum sustainable capacity (MMbpd)	Capital expenditure² (billion)	Net cash³ (billion)
251.2	12.0	\$42 SAR 158	\$27 SAR 103
Net chemicals production capacity¹⁰ (MMtpa)	Net refining capacity (MMbpd)	Average capital employed³ (billion)	
59.6	4.1	\$545 SAR 2,043	
Relationships		Human	
External stakeholders⁴	Countries of operations	Company employees	Nationalities
<ul style="list-style-type: none"> Customers Partners Communities Suppliers Governments Investors 	50+	73,311	94*

Outcomes and impacts

Operations		Financial	
Products produced		Net income (billion)	Free cash flow⁹ (billion)
<ul style="list-style-type: none"> Crude oil Gas NGL Condensate Chemicals Refined products Base oils and lubricants Electricity Blue ammonia Nonmetallics 		\$121 SAR 455	\$101 SAR 380
Upstream carbon intensity⁵ (kg CO ₂ e/boe)	Reliability⁶ (%)	Dividends paid⁸ (billion)	Return on Average Capital Employed (ROACE)⁹ (%)
9.6**	99.8	\$102 SAR 381	22.5
Scope 1 emissions (MMtCO ₂ e)	Scope 2 emissions⁵ (MMtCO ₂ e)	Human	
54.4**	13.0**	Lost time injuries/illnesses rate (per 200,000 work hours)	Total recordable case rate (per 200,000 work hours)
Power supplied to the national grid (gigawatts)	Freshwater consumption (million m ³)	0.018**	0.042
1.1	89.9**	Tier 1 process safety events	Fatalities
		15	3**
Relationships			
iktva procurement spend in-Kingdom (%)	Payments to Saudi and foreign governments⁷ (billion)		
65.0	\$205 SAR 769		

* Metric reported for the first time externally.
 ** This figure has undergone/is undergoing external limited assurance in accordance to the ISAE 3000 (revised). Upon completion of assurance, the assurance report can be found [online](#) on the Sustainability section of our website.
 1. Hydrocarbon reserves of Saudi Arabian Oil Company (the Company) as at December 31, 2023, under the Concession agreement.
 2. Capital expenditures do not include external investments.
 3. For definition of average capital employed and net cash, refer to "Non-IFRS measures reconciliations and definitions" section on page 36 in the Aramco Annual Report 2023.
 4. Refer to page 20 for more information on our stakeholders and how we work with them.
 5. In 2023, along with the location-based methodology we have reported to date, we adopted the market-based methodology to calculate and report on our GHG emissions to avoid double counting of emissions associated with wheeled power, in line with GHG Protocol Scope 2 Guidance. Therefore, the figures reported for upstream carbon intensity and Scope 2 emissions are market-based. For 2023, the location-based figures for upstream carbon intensity and Scope 2 emissions are 10.7 kg CO₂e/boe and 18.2 MMtCO₂e, respectively. For more information on our GHG methodology, please refer to page 30 of this report.
 6. Applies to Saudi Arabian Oil Company (the Company).
 7. Includes income taxes, royalties, and dividends to the Saudi government.
 8. Dividends paid includes dividends to shareholders and non-controlling interests in subsidiaries.
 9. Non-IFRS measure: refer to "Non-IFRS measures reconciliations and definitions" section on page 36 in the Aramco Annual Report 2023.
 10. Excludes SABIC Agri-Nutrients and Metals (Hadeed) businesses.

A year of delivering on our strategy



Liquids-to-chemicals expansion

Aramco and its affiliate, S-Oil, commenced construction of the \$7 billion Shaheen project in South Korea to develop one of the world's largest refinery-integrated petrochemical steam crackers.

This represents a significant step forward in our liquids-to-chemicals expansion.

Valvoline Inc.'s acquisition

Aramco completed the \$2.76 billion acquisition of Valvoline Inc.'s global products business, accelerating the company's vision to become one of the world's preeminent integrated energy and chemicals companies.

Developing new ammonia cracking technology

Signed an agreement with Linde Engineering to jointly build a demonstration plant to test a new ammonia cracking technology in Germany.

Three blue ammonia shipments

Aramco delivered three shipments of accredited, blue ammonia through its affiliates ATC and SABIC Agri-Nutrients.

First-of-its-kind synthetic fuel demonstration plant

Aramco and ENOWA to develop first-of-its-kind synthetic fuel demonstration plant.



Powering engines through lower-carbon fuels

Aramco and Stellantis collaboration finds Aramco-provided synthetic fuel compatible with 24 engine families in Europe. The use of lower-carbon synthetic fuel can reduce CO₂ emissions from existing vehicles.



MidOcean Energy acquisition

Aramco entered the global LNG business by signing a definitive agreement in September 2023 to acquire a minority stake in MidOcean, enabling Aramco to tap into international LNG opportunities.

Oil from plastic waste

Aramco, TotalEnergies, and SABIC have for the first time in the Middle East and North Africa successfully converted oil derived from plastic waste into International Sustainability and Carbon Certification (ISCC+) certified circular polymers.

Investment in Rongsheng Petrochemicals

A \$3.4 billion deal advances Aramco's liquids-to-chemicals strategy, increasing our presence in China.

Siemens Direct Air Capture (DAC) partnership

Aramco collaborated with Siemens Energy to develop a DAC test unit in Dhahran that could pave the way for a larger plant.



Investment in solar projects

Entered into a shareholders' agreement to develop two photovoltaic solar projects in Al Shuaibah with a planned combined capacity of 2.7 GW.

World Economic Forum (WEF) Global Lighthouse

Yanbu Refinery becomes fourth Aramco facility to receive the WEF Global Lighthouse Network status.

2023 at a glance

Our sustainability performance

Our focus areas

Aramco has an important role in helping the world navigate the energy transition. What we do as a global community will determine the legacy we leave for future generations.

Our intention is to be a part of the solution that creates a stable energy environment that fosters

innovation and growth opportunities in developing and developed countries.


We also aim to deliver a healthy, safe, and rewarding environment for our people, our suppliers and communities where we operate while rehabilitating and mitigating the impact on our natural environment.

We have four focus areas that provide an overview of how Aramco manages its sustainability performance:

- Climate change and the energy transition;
- Safe operations and people development;
- Minimizing environmental impact; and
- Growing societal value.

Underpinning these focus areas are metrics. Increasing metrics is important for us, as we would not be able to manage our sustainability performance effectively, without having meaningful metrics that measure our sustainability impact.

Therefore, we are pleased to share that in our third sustainability report, as we continue to progress on our sustainability journey, we have a 21% increase in the number of metrics in this report (74 metrics versus the 61 metrics in our 2022 Sustainability Report), and have expanded the number of metrics undergoing external assurance to 18 metrics (16 metrics in our 2022 Sustainability Report).



Climate change and the energy transition

We aim to provide affordable, reliable energy as one of the lowest upstream carbon intensity producers of hydrocarbon products; while we continue our ambition to achieve net-zero Scope 1 and Scope 2 GHG emissions across wholly-owned operated assets by 2050.

■ For more details, see page 22

- Established the New Energies organization following the endorsement of our long-term strategy to achieve lower-carbon solutions and for Aramco to meet its GHG emissions mitigation and abatement ambitions
- Upstream methane emissions reduction by 5.1% and upstream methane intensity maintained at 0.05%**
- Energy efficiency initiatives resulting in avoidance of 0.73 MMtCO₂e
- Played a key role in Oil and Gas Decarbonization Charter, a global industry charter established at COP 28 and signed by more than 50 oil and natural gas companies
- Largest buyer of carbon credits in the Regional Voluntary Carbon Market Company's second auction in Nairobi, Kenya in June 2023

Scope 1 emissions¹
(MMtCO₂e)
54.4**
(2022: 55.7**)

Scope 2 emissions^{1,2}
(MMtCO₂e)
13.0**
(2022: 10.3**)

Upstream carbon intensity²
(kg CO₂e/boe)
9.6**
(2022: 9.3**)



Minimizing environmental impact

We strive to conserve natural resources, apply circular models across our value chain, and to have a legacy of projects that improve both natural habitats and shared resources.

■ For more details, see page 64

- Achieved 100%** ISO 14001 certification at 52 upstream and downstream asset-based organizations enrolled in Aramco's Environmental Management System (EMS)
- Continued upgrading Sulfur Recovery Units (SRU) with tail gas treatment units
- Designated additional Biodiversity Protection Areas (BPAs), bringing the total number of BPAs to 14
- Continued pursuing a water neutrality aspiration
- Planted approximately 6.5 million mangroves and an additional 1.1 million native trees

Net positive impact on biodiversity
(%)
85.6¹**
(2022: 53**)

Hydrocarbon spills
(number)
12
(2022: 15)

Freshwater consumption
(million m³)
89.9**
(2022: 93.6**)



Safe operations and people development

We aim to provide a safe and respectful working environment for all, on-site and within the community, supported by comprehensive policies, and resources. We strive to support, diversify, and empower our workforce.

■ For more details, see page 50

- Aramco achieved historic hiring levels, reaching over 73,300 employees
- Over 20% of direct hires were female
- 26.3% increase in the percentage of female employees in leadership positions
- The National Training Centers have collectively had 57,943 graduates since inception
- Largest-ever College Preparatory Program cohort to graduate with 358 students
- More than 2,000 students benefited from the Intermediate Science, Technology, Engineering, and Mathematics (STEM) program in collaboration with the Ministry of Education
- Aramco's total recordable case rate improved by 16.0% in 2023 and represents the best Company performance on its record

Tier 1 process safety events
(number)
15
(2022: 11)

Fatalities
(number)
3**
(2022: 5**)

Female employees
(%)
7.2
(2022: 6.4)



Growing societal value

We seek to grow value wherever we operate. With our headquarters in Saudi Arabia, we have invested in the Kingdom's oil and gas ecosystem to enhance the reliability of our supply chain, providing employment and economic opportunities to thousands of Saudi nationals.

■ For more details, see page 78

- Continued commitment to building the capacity of locals with over 24% (15,099 in 2023 versus 12,160 in 2022) increase in the number of people in our sponsored² community programs
- Providing growth acceleration services, via the Taled program, to support small and medium-sized enterprises (SMEs) sustainability and scale up including partnership and network building, business development, and attracting investments
- Social investments³ of \$475 million were made in Saudi Arabia and abroad
- Aramco and its employees donated over \$18 million for disaster relief globally

iktva procurement spend in-Kingdom
(%)
65
(2022: 63)

Saudization
(%)
90.3
(2022: 90.9)

Social investment³
(\$ million)
475
(2022: 453)

** This figure has undergone/is undergoing external limited assurance in accordance to the ISAE 3000 (revised). Upon completion of assurance, the assurance report can be found [online](#) on the Sustainability section of our website.

1. The Jazan Refinery is excluded from our GHG reporting in 2022 and 2021. In 2023, only the stabilized units of Jazan Refinery are included in our GHG metrics reporting.
2. In 2023, along with the location-based methodology we have been reporting in our disclosures to date, we have also adopted a market-based methodology to calculate and report on our GHG emissions to avoid double counting of emissions associated with wheeled power, in line with GHG Protocol Scope 2 Guidance. Therefore, the figures reported for upstream carbon intensity and Scope 2 emissions are market-based. For 2023, the location-based figures for upstream carbon intensity and Scope 2 emissions are 10.7 kg CO₂e/boe and 18.2 MMtCO₂e, respectively. For 2022, the location-based figures for upstream carbon intensity and Scope 2 emissions are 10.3 kg CO₂e/boe and 16.1 MMtCO₂e, respectively. For more information on our GHG methodology, please refer to page 30 of this report.

** This figure has undergone external limited assurance in accordance to the ISAE 3000 (revised). The assurance report can be found [online](#) on the Sustainability section of our website.

1. Ongoing management and review of the BPAs resulted in exclusion of the Manifa BPA from our NPI metric as a BPA, pending implementation of enhancements to align with the Company's biodiversity governance.
2. These programs include the Vocational College Internship Program (VCIP), University Internship Program (UIP), Summer enrichment program, Tomooh program, Advantage program, and Arizona Centers for Comprehensive Education and Life Skills (ACCEL) International Ajyal Center.
3. Updated methodology: this is the first year we are reporting on the costs of running Aramco-built schools, as part of our social investment. We have also revised the prior year figure to reflect this change. With this updated methodology, the 2022 figure is now \$453 million compared to \$370 million under the previous methodology.

90 years driving sustainable growth

1933-1945

The birth of Arabian oil

1933

The beginning: unlocking the Kingdom's vast oil resources with the crude oil Concession agreement (signed with Standard Oil of California)

1940

Beyond employment: providing additional educational opportunities for Saudis

1941

Boosting agriculture: surveying land and drilling wells to provide valuable water for farmers

1943

Employee health: helping local communities to eradicate malaria

1946-1959

Setting our sustainability foundations

1946

Developing local supply chains: providing technical and financial assistance to Saudi entrepreneurs

1949

In-house training: investing in on-the-job technical and administrative training

1950s

Building leaders: offering scholarships to study in the US to top-performing Saudis

1960-1975

Taking bold leaps forward

1960

Female education: building elementary schools for girls in the Eastern Province

1975

Master Gas System: Decision made to build the Master Gas System, enabling one of the world's largest gas markets, transforming the national energy mix toward natural gas and building the cornerstone for the economy's industrialization

1978

Groundwater protection: Establishing the Qurayyah Sea Water Plant to support our operations and conserve groundwater

1976-1989

Becoming the world's largest oil producer

1976

Became the world's leading oil producer in terms of volume produced in a single year

1988

Saudi Arabian Oil Company officially established

1990-2004

Protecting resources and reducing emissions

1990s

Protecting ecosystems: responding swiftly and efficiently to the Gulf War oil spills

Reduced lead content fuels: halved the lead content of produced gasoline, and ceased production of leaded gasoline entirely by the end of 2001

1993

Mangrove restoration: first mangrove trees planted

2001

Recycling and reuse: devising innovative applications for Aramco's wastewater

2005-2020

Innovative sustainable solutions

2009

Flare monitoring system: development of an in-house system driving flare reduction results

2013

Sustainable offices: the new Al-Midra offices achieves LEED platinum certification (Leadership in Energy and Environmental Design)

2015

Accelerating change: founding member of the Oil & Gas Climate Initiative (OGCI)

Hawiyah carbon capture, Utilization and storage pilot: Capacity to capture 800,000 tons CO₂ per annum

Domestic value creation: launch of iktva (in-Kingdom Total Value Add) program

2016

Nurturing biodiversity: reintroduction of oryx and gazelle in Shaybah Wildlife Sanctuary

2017

Using alternatives: installing the Kingdom's first wind turbine at the Turaif Bulk Plant

2018

Cultural enrichment: opening of Ithra – the King Abdulaziz Center for World Culture

2019

Bringing hydrogen to the local market: inaugurating Saudi Arabia's first hydrogen fueling station

2020

Blue ammonia: world first shipment of blue ammonia, opening new routes to a more sustainable future

2021-2023

Transformation and energy security

2021

Sudair renewable project: Aramco joined a consortium to develop a 1.5 GW solar plant

First Sustainability Report: Aramco issues its first sustainability report, outlining what sustainability is for Aramco and how we manage it

Net-zero: Aramco announced its ambition to achieve net-zero Scope 1 and Scope 2 greenhouse gas emissions by 2050 from our wholly-owned operated assets

2022

Net-positive biodiversity: announced ambition to deliver a net positive impact, building on our work in over 985 km² of protected areas

Sustainability Fund: Aramco established a new \$1.5 billion Sustainability Fund to invest in technologies needed to address climate challenges

Carbon capture and storage: Signed an agreement to construct one of the world's largest planned carbon capture and storage hubs

Blue ammonia and blue hydrogen: Granted the first certification for blue ammonia and blue hydrogen for SASREF/SABIC AN

2023

Expanding renewable energy: Agreed to invest in the Al Shuaibah 1 and Al Shuaibah 2 photovoltaic solar projects which are expected to have a combined capacity of 2.7 GW

Circular economy: Aramco, TotalEnergies and SABIC complete MENA region's first processing of oil from plastic waste at scale to make certified circular polymers

Chairman's message



We know that global net-zero ambitions cannot be achieved solely by reducing the emissions associated with conventional energies. The success of the transition to a lower emissions future will also hinge on the availability of multiple lower carbon options, some of which may be more suitable in certain contexts than others. That is why we are pursuing the development and deployment of technologies and tools that can contribute to global emission reduction efforts, including carbon capture and storage, "drop-in" lower-carbon fuels, blue hydrogen, renewables, and offsets.

We have also more than doubled the funding for our global venture capital arm, with half of the additional \$4 billion being injected into Aramco Ventures earmarked for investment in late-stage, larger-ticket ventures in the sustainability and digital domains.

Focusing on sustainability

In this report, we elaborate on our sustainability-related ambitions, targets and metrics as well as our progress to date. It is worth also noting that for Aramco, sustainability means going above and beyond just being a reliable supplier of energy to customers around the world. It also means being a responsible corporate citizen environmentally, socially and economically. This is underpinned by our focus on addressing climate change as part of the global energy transition, maintaining safe operations while ensuring people development, minimizing environmental impacts, and also continuing to grow societal value.

Throughout 2023, I am proud to say that Aramco maintained positive momentum in each of these areas due to the dedication of our talented team of employees. Our accomplishments would also not have been possible without the continued support and vision of The Custodian of the Two Holy Mosques King Salman bin Abdulaziz Al-Saud, and His Royal Highness Prince Mohammed bin Salman bin Abdulaziz Al-Saud, Crown Prince and Prime Minister of the Kingdom of Saudi Arabia.

Clearly, the global transition to a lower carbon future is a complex journey rather than a singular event. What is also clear is that Aramco has a key role to play in this energy transition.

H.E. Yasir O. Al-Rumayyan
Chairman of the Board of Directors

Investing in growth

In 2023, we celebrated the 90th anniversary of the Kingdom signing the Concession agreement. The milestone was an opportunity to reflect on our Company's remarkable longevity and the source of our enduring success. As we look back with pride over the past nine decades, one common thread emerged: an unwavering commitment to the long-term prosperity of our communities, our customers, and our stakeholders.

Throughout our history, that commitment has always required us to carefully balance short-term and long-term needs. It is a responsibility that has taken on even greater urgency with the risks posed by climate change. How to facilitate the transition toward a more climate-conscious tomorrow without disrupting the manufacturing, trade, and transportation that are so essential to billions of lives today is one of the defining challenges of our time.

Supporting the energy transition

Aramco is intent on being part of the global solution. With the world's energy demand continuing to grow, we are striving to ensure reducing GHG emissions in our conventional energy – which remains critical to meeting demand. We are pursuing a variety of pathways to achieve that objective, including by improving the energy efficiency of our operations, minimizing flaring and further reducing our GHG emissions. These efforts have helped us to attain an upstream carbon intensity that is ranked among the lowest in the industry.

President and CEO's message



Our partnerships also extend to our Downstream business where we furthered our long-term goal of directing up to four million barrels per day into liquids-to-chemicals by 2030. In Asia we broke ground on two integrated refinery and petrochemical complexes, one through our affiliate S-Oil in South Korea and another through a joint venture, HAPCO, in China. We also acquired a 10% stake in Chinese petrochemical company, Rongsheng.

Supporting local communities and economic growth

Our Namaan industrial investment program continues to support new industries in the Kingdom. One such example from 2023 is the establishment of an integrated steel plate manufacturing complex in Ras al-Khair Industrial City. This joint venture with Baosteel and the Public Investment Fund will be the first facility of its kind in the region, creating jobs and growing the economy. It is also expected to help localize our supply chain, an important iktva objective.

A Novel Non-Metallic Solutions joint venture with Baker Hughes is another supply chain localization success. The development and commercialization of nonmetallic products at the King Salman Energy Park is helping create a thriving in-Kingdom energy value chain. The nonmetallic reinforced thermoplastic pipes being produced are corrosion resistant and easier to install. This means that as well as the localization benefits in production this new material also mitigates carbon in the field too.

On production, hydrocarbons will increasingly be used without combustion, providing essential ingredients for new and innovative materials needed for the energy transition.

Maintaining a culture of safety

Safety is always at the front of our minds and despite a continual improvement for recorded incidents at Aramco facilities, we regrettably suffered the loss of three lives from our team of contractors. Thorough investigations have been carried out to avoid reoccurrences, the learnings from which have been shared with relevant teams. No loss of life is acceptable and we are committed to maintaining a culture of safety excellence.

Living our values

This year's report demonstrates the progress we as a company are making to encourage sustainability in our operations and to support the Kingdom's sustainable development. I want to pay tribute to those making it happen, as our plans are only as good as our people. The men and women of Aramco stepped up again in 2023 to deliver for the company and those who rely on us. I am proud of the values they demonstrate every day and know we will continue to make great strides together.

Amin H. Nasser
President and CEO

Innovating for sustainability

Aramco's role as the indispensable partner to a realistic and robust energy transition puts us in a unique position. We take the responsibility seriously and have put sustainability at the heart of our strategy. Old problems are being met with new solutions and I am proud of what we have achieved.

Collaborating to drive more sustainable solutions

Collaboration is a key part of our approach and we have been working with Siemens Energy on a brand-new Direct Air Capture test unit at our Dhahran base in Saudi Arabia. This new test unit is expected to have the capacity to capture up to 12 tons of CO₂ from the atmosphere per year and could pave the way for a larger plant with the ability to capture more than 100 times that amount.

Alongside Danish technology leader Topsoe, we have plans to build a lower-carbon hydrogen production demonstration plant at Shaybah, deep in the desert. We expect to have a production capacity of six tons of hydrogen per day and use renewable electricity in electrified steam reforming of hydrocarbons to produce lower-carbon hydrogen for use in power generation, with resulting CO₂ being captured and sequestered.

On carbon sequestration, we have piloted a novel method with our partners at King Abdullah University of Science and Technology using situ mineralization which involves dissolving CO₂ in water and injecting it into volcanic rocks. This process permanently converts CO₂ into carbonate rocks, and has led to the development of innovative technologies that reduce cost and increase efficiency.

Value of oil and gas

Oil and gas: an integral part of everyday life

Oil and gas are not just reliable energy sources; they are also a key component of the thousands of everyday products we need for modern living that influence most aspects of human life.



Ensuring food security

Natural gas is the primary feedstock for synthetic ammonia that forms the basis of fertilizers, essential for high yield food crops ensuring adequate supply and nutrition.

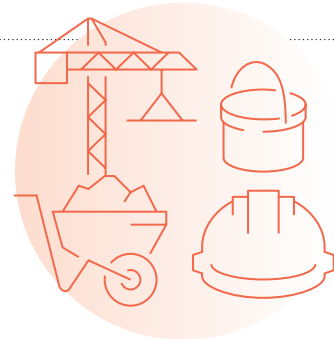


8 billion

people depend on stable food security, affordability, and access. Source: [United Nations, 2022](#)

Fueling development

Oil and gas fuel the production of cement and steel; key ingredients for development of essential infrastructure. Oil-based products are used in the manufacture and operation of construction machinery advanced polymer products, and key building materials such as paint.

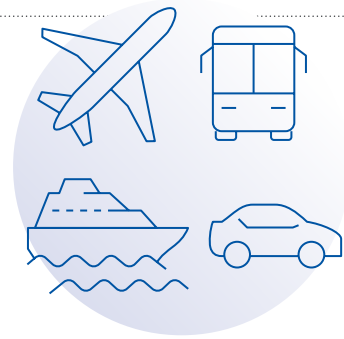


4.1 billion tons of cement

produced annually, as well as over 1.7 billion tons of steel. Source: [Global Cement and Concrete Association, 2024](#)

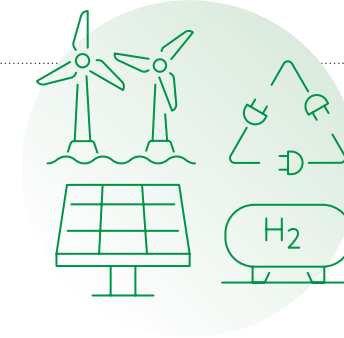
Enabling global mobility

Long-haul travel remains reliant on oil and gas. Furthermore, oil-based products are essential for value chains of traditional and electric car manufacturing including durable lightweight carbon materials, (which enhance energy efficiency) along with rubber used in tires, gaskets, and seals.



95%

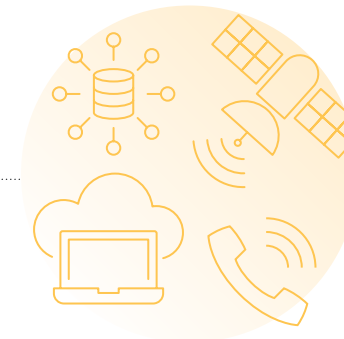
of transport energy comes from fossil-derived liquid fuels. Source: [Transportation Engineering, 2020](#)



Powering the pathways towards net-zero

A materials transition is essential to enable an energy transition. The manufacture, operation, and transportation of renewable energy infrastructure is, today, part of the oil and gas value chain. Gas is also used in the production of blue hydrogen.

90 MMT of crude oil equivalent: The oil products and gas required to manufacture the composite fibers needed to have 2.5 TW of installed wind power is equivalent to 90 MMT of crude oil. Source: [Smil, 2016](#)



Connecting people

Hydrocarbons are essential for modern communication. Petrochemical products (e.g., plastics) are used to build data cables that enable internet connectivity and mobile and other computer devices.

3.6 devices per person

Connections per capita by 2023. Source: [CISCO Internet Report 2020](#)



Supporting healthcare

Petrochemicals are a key ingredient in pharmaceutical, and medical equipment, from artificial limbs, to heart valves, to PPE.

99% of pharmaceutical feedstocks and reagents are derived from petrochemicals. Source: [Canadian Energy Centre, 2024](#)



Making life comfortable

From the clothes we wear, to the health and beauty products we use, to the games we play and sports we pursue, thousands of our everyday products are derived from petrochemicals.

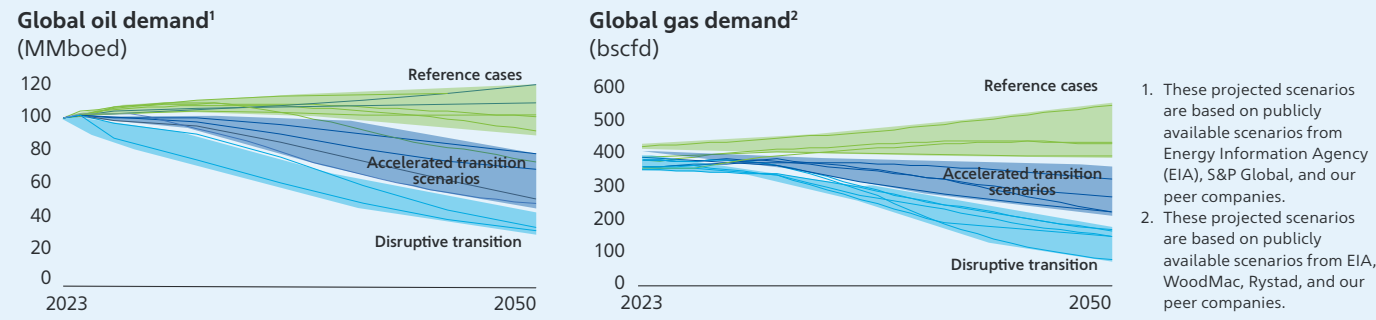
70% Synthetic fibres that use hydrocarbons make up about 60% of clothing and 70% of household textiles. Source: [European Environment Agency, 2021](#)

Positioning Aramco for the future

Oil and gas will play an essential role for a practical, stable, and orderly energy transition

A vast range of projections exist for global energy demand indicating that oil and gas is expected to continue to be an essential part of the mix.

Global total oil and gas demand by scenario, 2023-2050



What are these scenarios?

They are alternative pathways depicting future energy landscapes. These scenarios can broadly be categorized into three groups. Reference case scenarios depict a landscape that assumes slow incremental development in line with past trends, with new developments that have a high probability of occurring in the future and hydrocarbons continuing to play a major role in the energy mix. Accelerated transition scenarios project a phasing down of hydrocarbons which contrasts with the historical trend of adding new sources of energy, but never phasing out existing sources of energy. Disruptive transition scenarios which are a goal-seeking process of 'what needs to be done' to reach net-zero emissions by 2050 rely on technological breakthroughs and forceful displacement of existing energy systems, but lack plausibility, a key criterion for developing scenarios. Under all projected scenarios above, oil and gas is expected to continue to play an eminent role in meeting global energy demand.

Why oil and gas is expected to be part of the energy mix?

Oil has maintained the largest share in the global energy mix for almost six decades and the share of natural gas is continuing to increase. The global transportation system is almost exclusively dependent on oil, while many hard-to-abate sectors depend on oil for its superior energy-density properties. Electrification of road vehicles targets only about one-quarter of total oil demand. Despite impressive growth over the past few years, electric cars are not expected to offset energy demand growth.

Beyond a source for energy through combustion, the role of oil and gas is set to evolve in lockstep with a transition to lower emissions. A 'materials transition' will see a significant increase in demand for both existing and alternative materials, and this will be key to enabling the wider energy transition. Nonmetallic and carbon-based materials have numerous strength and lightweight benefits, and have the potential to increasingly

supplement and displace materials such as steel and cement, which are more GHG emission intensive across their life-cycle.

Natural gas will help facilitate a shift to lower emissions by replacing higher carbon-emitting coal in electricity generation. Gas will also remain a critical feedstock for fertilizer production – important to meeting the world's growing demand for food as the global population continues to grow.

The continued presence of hydrocarbons in the energy mix will necessitate that emissions management play an increasingly important role going forward with investments into CO₂ removals and offsets.

How do we use scenarios?

Aramco's in-house experts develop scenarios using advanced tools and models. These scenario narratives are founded on the energy-trilemma framework developed by the World Energy Council. They not only depict the trade-offs between affordability, security, and sustainability but also find sweet spots where the trilemma can potentially converge. These scenarios help us benchmark against consensus views and evaluate their plausibility with ongoing policy developments, technological progress, and investment levels.

What do these scenarios tell us?

Scenarios tell us the window of uncertainty and possible outcomes in our business landscape. They also assist in assessing the resilience of our current business and future investments. Aramco's hydrocarbon products have one of the lowest upstream carbon intensity among its peers. As Aramco continues its efforts to enhance its reliability and upstream carbon intensity, these two factors will potentially make our operations resilient under the evaluated scenarios.

Our ambition: to be the supplier of choice for oil and gas with lower upstream production carbon intensity

With one of the lowest upstream carbon intensity and cost per barrel in the world, we will continue to demonstrate leadership in supporting a practical, stable, and orderly energy transition.

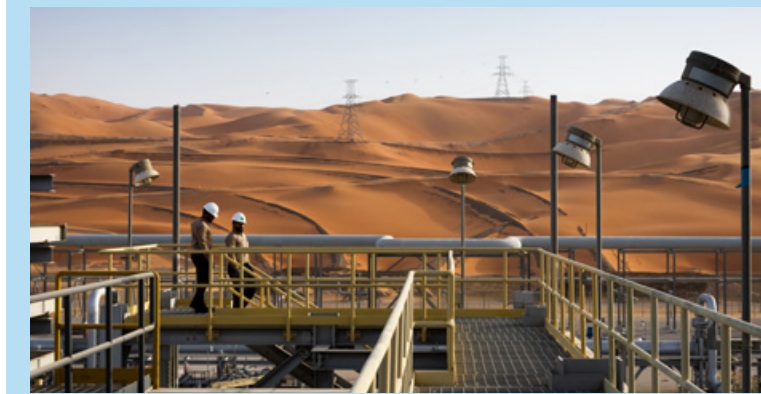
For more information about our strategic approach see page 14

Lower upstream carbon intensity

Upstream carbon intensity (kg CO₂e/boe) **9.6****
Upstream methane intensity (%) **0.05**

Low cost and high capacity

Total hydrocarbon reserves (billion boe) **251.2**
Maximum sustainable capacity (MMbpd) **12.0**
Reliability (%) **99.8** product delivered within 24 hours of the scheduled time
Average upstream lifting costs (\$/boe) **3.19**



** This figure has undergone external limited assurance in accordance to the ISAE 3000 (revised). The assurance report can be found [online](#) on the Sustainability section of our website.

1. Includes income taxes, royalties, and dividends to the Saudi government.
2. Updated methodology: this is the first year we are reporting on the costs of running Aramco-built schools, as part of our social investment. We have also revised the prior year figure to reflect this change. With this updated methodology, the 2022 figure is now \$453 million compared to \$370 million under the previous methodology.
3. In line with the new methodology of calculating the training hours, the total number of training hours includes all training offered corporate-wide during the year for all employee categories in addition to trainees and contractors.

Beyond products

Other ways that Aramco contributes to society

People

73,311 employees
\$16,088 million wages

Governments

\$205 billion payments to the Saudi and foreign governments¹

Society

\$475² million social investment
\$202.9 billion cumulative iktva GDP contribution since 2015
63% sustainability-related R&D spent
160 schools built and maintained
9 million³ hours spent on educating our people (training and development)

Positioning Aramco for the future

Sustainability and our strategy

Increasing shareholder and societal value

Global fossil fuel prices remain volatile. Protracted conflicts in Ukraine and the Middle East have re-emphasized the link between geopolitical risk and energy security.

This has contributed to high inflation, and geopolitical tensions have created significant global energy supply challenges.

This series of deepening shocks, crises, and tensions has underscored the need for a just, orderly, and inclusive energy transition to mitigate anthropogenic climate change while addressing the three elements of the energy trilemma: affordability, security, and sustainability.

Aramco – as one of the world’s largest integrated energy companies – is uniquely positioned to address all three elements of this challenge, helping to ensure a secure and more sustainable future for all.

Our upstream carbon intensity is already among the lowest in the industry per barrel of oil equivalent, and we are working to reduce this intensity further. We are pursuing measures to reduce our upstream carbon intensity, including specific measures to reduce our gas flaring and methane intensity.

We are planning to increase our production of natural gas – with a mix of both conventional and unconventional – by more than 60% by 2030. This will support the Kingdom’s drive away from crude oil and liquids for power generation.

We are also developing and scaling alternative energies and technologies that are expected to be critical to lowering emissions, including carbon capture and storage (CCS), blue hydrogen, blue ammonia, renewables, and synthetic fuels.

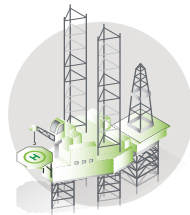
Through this integrated approach, we are facilitating an orderly and practical energy transition while strengthening our unique and central role to meeting the world’s growing energy needs.

Our strategic themes

To achieve its vision, Aramco focuses on four strategic themes across its businesses:

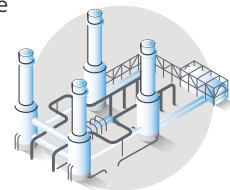
Upstream preeminence

As the principal engine of value generation, Aramco intends to maintain its position as the world’s largest crude oil company by production volume and one of the lowest-cost producers. The Company’s vast reserves base, spare capacity, and unique operational flexibility allow it to respond effectively to changes in demand.



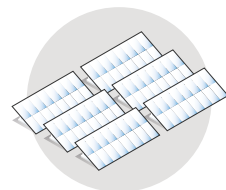
Downstream integration

Aramco has a dedicated system of domestic and international wholly-owned and affiliated refineries that are critical to monetizing its upstream production. Through continued strategic integration, the Company captures additional value across the hydrocarbon chain.



Lower-carbon initiatives

Aramco aims to lower the net GHG emissions of its operations and support the global energy transition through development of a New Energies business that includes renewable power generation and products and solutions that emit less carbon dioxide during production than traditional fossil fuels, across the energy, chemicals, and materials sectors.



Localization and the promotion of national champions

Aramco facilitates the development of a diverse, more sustainable and globally competitive in-Kingdom energy ecosystem to underpin the Company’s competitiveness and support the Kingdom’s economic development.



Our key enablers

Aramco’s strategy requires a number of enablers to be successful, including:

People

Aramco recognizes the need to prepare its workforce of the future to ensure its capabilities match our strategic requirements. This includes advancing technical and professional skills, developing commercial and leadership competencies, supporting the progress of localization, and focusing on diversity and inclusion.

Technology

Aramco’s technology program aims to develop new solutions for its upstream and downstream businesses, help diversify its product portfolio, grow its business sustainably, and reach its ambition to achieve net-zero Scope 1 and Scope 2 GHG emissions across wholly-owned operated assets by 2050. The program also aims to enable Aramco to grow its business competitively and sustainably in new areas such as new energies, advanced materials, and digital solutions.

Portfolio optimization

Aramco seeks to unlock value, enhance its capital structure, and reallocate capital to higher growth and return investments. Aramco has a comprehensive and disciplined internal approval process for capital expenditures, new projects, and debt issuance.

Our sustainability focus areas



Climate change and the energy transition

■ For more information see page 22



Safe operations and people development

■ For more information see page 50



Minimizing environmental impact

■ For more information see page 64



Growing societal value

■ For more information see page 78

Governance

■ For more information see page 94

Our approach to sustainability

Our sustainability framework

Our sustainability framework presents the key areas that hold the greatest potential for our business to have long-term positive impacts, connecting the Saudi Vision 2030 and UN SDGs to our four focus areas, which incorporate the material sustainability

topics stakeholders expect from us, and we feel a responsibility to address. Our sustainability focus areas and sustainability performance is overseen by governance provided by our Board of Directors.



Our material sustainability topics

Similar to previous years, in 2023, we conducted a materiality¹ refresh to evaluate whether our sustainability focus areas, material topics, prioritized UN SDGs, and metrics remain appropriate and relevant.

This assessment is a detailed analysis of the risks and opportunities that interest our stakeholders that we feel we have an influence over and serves as an important process for selecting key sustainability topics for Aramco.

This process includes:

- External stakeholder engagements (details on pages 20 and 21);
- Internal stakeholder engagements (details on page 20);
- Review of existing (e.g., Ipeca sustainability guidelines) and upcoming standards (particularly the International Sustainability Standards Board (ISSB), and regulatory requirements around the world, including Europe, Saudi Arabia, and USA); and
- Peer benchmarking.

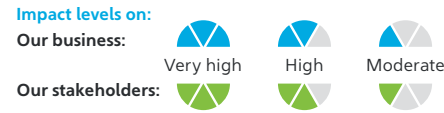
Upon completion of our materiality refresh exercise and extensive stakeholder engagement, a summary of conclusions and subsequent actions, where appropriate, are provided below:

- Our four focus areas (plus our focus on corporate governance²) are still appropriate and relevant;
- Thirteen material sustainability topics, plus a focus on corporate governance, have been identified as being the issues stakeholders expect from us, and we feel a responsibility to address;
- Affirmation that Aramco's roadmap to establish additional metrics to better monitor, manage and report on our performance under each focus area and material topic is correct. Due to the increasing maturity of existing metrics and the introduction of new metrics by relevant guidelines and regulatory requirements, we have increased the number of metrics in this report to 74 (an increase of 13 metrics from the 61 metrics in our 2022 Sustainability Report); and
- Increasing the number of our metrics in our Sustainability Report undergoing external assurance; from 16 metrics in 2022 to 18 metrics in 2023.

1. The concept of 'materiality' refers to the guidance on external reporting from the Global Reporting Initiative, and does not necessarily correspond to the concept of materiality used in connection with Aramco's financial reports.
 2. For more information on our governance, relevant material topics and our governance metrics, please refer to page 94 in this report, and page 90 in the 2023 Aramco Annual Report.

Our approach to sustainability

Mapping our material sustainability topics



Climate change and the energy transition For SDG contribution see page 22

Material topic and impact	Relevant metric to monitor performance against material issue	SDGs
Climate change (including GHG emissions) 	<ul style="list-style-type: none"> Scope 1 emissions (million metric tons of CO₂e) Scope 2 emissions (location-based) (million metric tons of CO₂e) Scope 2 emissions (market-based) (million metric tons of CO₂e) Upstream carbon intensity (location-based) (kg CO₂e/boe) Upstream carbon intensity (market-based)* (kg CO₂e/boe) Upstream methane emissions (metric tons of CH₄) Upstream methane intensity (%) Flaring intensity (scf/boe) Flared gas (MMscf) Energy intensity (thousand Btu/boe) Energy consumption* (MMBtu/hr) Patents filed in sustainability technologies* (%) Sustainability-related R&D spend* (%) 	

Safe operations and people development For SDG contribution see page 50

Material topic and impact	Relevant metric to monitor performance against material issue	SDGs
Workforce protection 	<ul style="list-style-type: none"> Lost time injuries/illnesses rate (per 200,000 work hours) Total recordable case rate (per 200,000 work hours) Health performance (%) Fatal accident rate* (per 100,000,000 work hours) Number of fatalities 	
Process safety and asset integrity 	<ul style="list-style-type: none"> Number of Tier 1 process safety events 	
Human rights 	<ul style="list-style-type: none"> Number of grievances raised Sites with a grievance mechanism in place (%) 	
Labor practices 	<ul style="list-style-type: none"> Attrition rate (%) Number of Company employees Number of female employees Female (%) of total employees Female (%) of total number of new hires Number of female employees in leadership positions Female employees in leadership positions (%) Number of contractor employees Employee engagement score (%) Total hours of training and development Total hours of training and development (per employee) Employees acknowledging performance review meetings¹ (%) Number of hired graduates Number of apprentices (new intake) Number of interns Number of nationalities in the workforce* Breakdown of Company employees (by age)* 	

* Metric reported for the first time externally.
 1. In accordance with our ongoing review of our sustainability performance data, we have determined that the metric "Employees receiving regular performance reviews (%)" reported in 2022 and 2021 should be renamed "Employees acknowledging performance review meetings (%)" in order to more accurately reflect what this metric entails.



Minimizing environmental impact For SDG contribution see page 64

Material topic and impact	Relevant metric to monitor performance against material issue	SDGs
Local environmental impact 	<ul style="list-style-type: none"> Number of hydrocarbon spills Volume of hydrocarbon spills (bbl) Recovered hydrocarbons (%) Hydrocarbon discharge to water (barrels) Sulfur oxides (SOx) emissions (metric kilotons) Number of sites with ISO 14001 certification (%) 	
Biodiversity and ecosystem services 	<ul style="list-style-type: none"> Net positive impact (%) 	
Water management 	<ul style="list-style-type: none"> Freshwater consumption (million m³) Freshwater withdrawal (million m³) Freshwater intensity* (m³/boe) (total freshwater consumed relative to our hydrocarbon production) 	
Product stewardship and waste management 	<ul style="list-style-type: none"> Industrial waste disposed (metric tons) Industrial waste recycled (%) 	

Growing societal value For SDG contribution see page 78

Material topic and impact	Relevant metric to monitor performance against material issue	SDGs
Labor practices 	<ul style="list-style-type: none"> Number of people on Aramco sponsored community programs¹ 	
National content 	<ul style="list-style-type: none"> Saudization (%) Saudization of construction contracts (%) Saudization of service contracts (%) iktva procurement spend in-Kingdom (%) Cumulative iktva GDP contribution* (\$ billion) 	
Human rights (supply chain) 	<ul style="list-style-type: none"> % of active suppliers signed up to Aramco's Supplier Code of Conduct Number of active suppliers 	
Community and society 	<ul style="list-style-type: none"> Social investment (\$ million) Total number of volunteers² Total number of volunteering hours² Number of employee volunteers^{2,2} Number of Aramco facilitated community volunteers^{2,2} Number of employee volunteering hours^{2,2} Number of Aramco facilitated community volunteering hours^{2,2} 	
Economic contribution 	<ul style="list-style-type: none"> Direct economic value generated and distributed (\$ million) Total R&D spend (\$ million) 	





* Metric reported for the first time externally.
 1. These programs include the Vocational College Internship Program (VCIP), University Internship Program (UIP), Summer enrichment program, Tomooh program, Advantage program, and Arizona Centers for Comprehensive Education and Life Skills (ACCEL) International Ajyal Center.
 2. Increased data management identified that in the 2022 Sustainability Report, Aramco's volunteering hours consisted of not only employees' volunteering hours but also members of our communities. Therefore, from 2023 onwards, Aramco will now separately report the 'number of volunteers' and 'number of volunteering hours' for both employees and members of community volunteering with Aramco.

Our stakeholder engagement

Stakeholder engagement

Aramco recognizes that there is a social contract between our Company and the society within which it operates. Aramco interacts with a range of stakeholders to ensure that their perspectives are considered in the development of our business plans,

sustainability plans, and objectives; from project planning, to execution, long-term operations, and customer service. During the year, we engaged with stakeholders on a diverse range of topics.

	Communication channels and examples of engagement	Discussion topics
 Our people	<ul style="list-style-type: none"> Town halls Employee engagement surveys Employee networks Young Leaders Advisory Board (YLAB) Training Intranet Human resources Recognition events Senior leadership meetings Safety meetings Quarterly engagement talks on current events Management letters and emails 	<ul style="list-style-type: none"> Our vision and mission Corporate ethics and values Professional development Career progress Our strategy Sustainability Remuneration Health, safety and environment (HSE) performance Industry trends, current events Community support/volunteering
 Our customers	<ul style="list-style-type: none"> Customer feedback forms Face-to-face meetings Regular engagement between sales teams and our business customers Customer service centers Trade shows and conferences Email/newsletters 	<ul style="list-style-type: none"> Sustainability HSE performance Quality control
 Our suppliers, partners, and contractors	<ul style="list-style-type: none"> Business performance reviews On-boarding program Supplier facility visits Workshops Training programs 	<ul style="list-style-type: none"> Engagement on supply chain disruption and mitigation plans HSE requirements Agreeing ESG initiatives with suppliers to improve their capabilities Performance on quality, delivery, and price Supplier Code of Conduct iktva Conformance to Aramco policies, including Environment Policy
 Investors, financial institutions, rating agencies, and insurers	<ul style="list-style-type: none"> Quarterly earnings calls External disclosures Direct investor communication Annual General Meeting Annual insurance renewals Revolving credit facility meetings Conferences and non-deal roadshows Focused investor groups 	<ul style="list-style-type: none"> Climate change and the energy transition Financial and operational performance and outlook Environmental performance Human capital management Sustainability-related targets and performance Risk management

Communication channels and examples of engagement

Discussion topics

 Local charities and non-profit organizations	<ul style="list-style-type: none"> Volunteer events Student mentoring Community events Citizen Advisory Panel meetings Employee service on community boards 	<ul style="list-style-type: none"> Corporate donations Matching contributions Community needs
 Regulators and industry associations	<ul style="list-style-type: none"> Saudi ministries and regulators Ipieca US Environmental Protection Agency (EPA) American Petroleum Institute International Emissions Trading Association (IETA) American Fuel and Petrochemical Manufacturers American Society for Testing and Materials World Economic Forum OSHA ISSB Saudi Organization for Chartered and Professional Accountants (SOCPA) OGCI Saudi Exchange, Capital Market Authority, London Stock Exchange 	<ul style="list-style-type: none"> Standards setting Compliance with regulatory standards Workplace safety and incidents Project specific discussions Supply disruptions The energy transition Permits Knowledge sharing on best practices Collaboration on industry standards
 Our local communities	<ul style="list-style-type: none"> Volunteer events Student mentoring Community events Citizen Advisory Panel meetings City Council meetings School board meetings Economic development associations Local industry groups meetings Quarterly community newsletters Plant tours Direct mailings Conferences 	<ul style="list-style-type: none"> Social impacts of operations and expansion plans Pipeline awareness Workforce development Local content Community development and outreach Economic and social investments Charitable giving Emergency response and preparedness Environmental stewardship (e.g. establishment of mangrove eco-parks, beach rehabilitation campaigns etc) Health and wellness programs Mentoring programs and scholarships Small business support

Sustainability in action

Strengthening corporate governance across the Middle East

As part of our stakeholder engagement, Aramco is keen to work with local communities to build their capacities and capabilities.

One demonstration of this is our support in the development of effective corporate governance practices as one of the founders of the GCC Board Directors Institute (GCC BDI).

Since its inception, the GCC BDI has grown into one of the leading institutes of directors in the world, helping to improve Board effectiveness and capabilities across the region by training over 3,500 Board directors and executives, including over 2,400 in Saudi Arabia alone.



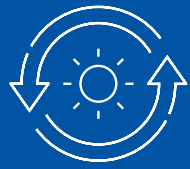
Climate change and the energy transition

Differentiate.....	28
Sustain	38
Diversify.....	42
Enable	44



◆ **Not just a rock**
Understanding the subsurface is key to finding optimal locations for geological storage of captured CO₂. CCS is one of the intended levers to reduce our upstream carbon intensity and meet our climate ambitions.

Climate change and the energy transition



There is no one-size-fits-all solution to the energy transition challenge. Instead, there must be a multi-source, multi-speed approach that recognizes the different regional starting points in the energy trilemma – security, affordability, and sustainability. Among our international oil and gas peers, Aramco is in a leading position with one of the lowest upstream carbon and methane intensities.

We have an ambition to achieve net-zero Scope 1 and Scope 2 GHG emissions across our wholly-owned operated assets by 2050; by 2035, we aim to reduce our upstream carbon intensity by 15% against our 2018 baseline of 9.1 kg CO₂e/boe. We aim to meet our carbon intensity ambition and mitigate 52 MMtCO₂e annually by 2035 from our business as usual forecast emissions.

In 2023, we established the New Energies organization following the endorsement of our long-term strategy to achieve lower-carbon solutions and for Aramco to meet its GHG emissions mitigation and abatement ambitions. Over the next few years, we have allocated around 10% of our capital investments in New Energies to help us progress in our GHG emissions mitigation and abatement journey³.

2023 performance

Total Scope 1 and Scope 2 emissions¹ (million metric tons of CO₂e)



Upstream carbon intensity¹ (kg CO₂e/boe)



Upstream methane emissions (metric tons of CH₄)



2050 net-zero ambition

across wholly-owned operated assets

15%

reduction of Scope 1 and Scope 2 upstream carbon intensity emissions by 2035

** This figure has undergone external limited assurance in accordance to the ISAE 3000 (revised). The assurance report can be found [online](#) on the Sustainability section of our website.

- In 2023, along with the location-based methodology we have been reporting in our disclosures to date, we have also adopted a market-based methodology to calculate and report on our GHG emissions to avoid double counting of emissions associated with wheeled power, as per the GHG Protocol Scope 2 Guidance. Therefore, the figures reported for upstream carbon intensity and Scope 2 emissions are market-based. For 2023, the location-based figures for total Scope 1 and Scope 2 emissions and upstream carbon intensity are 72.6 MMtCO₂e and 10.7 kg CO₂e/boe, respectively. For 2022, the location-based figures for total Scope 1 and Scope 2 emissions and upstream carbon intensity are 71.8 MMtCO₂e and 10.3 kg CO₂e/boe, respectively. The 2021 Scope 2 emissions and upstream carbon intensity figures are reported using a location-based method. For more information on our GHG methodology, please refer to page 30 of this report.
- The Jazan Refinery is excluded from our GHG reporting in 2022 and 2021. In 2023, only the stabilized units of Jazan Refinery are included in our GHG reporting.
- Please refer to page 97 for more information on the New Energies organization.

Performance of our key metrics

Material issue	Relevant metrics	2023	2022	Status
Climate change	Scope 1 emissions (million metric tons of CO ₂ e)	54.4 ^{**2}	55.7 ^{**2}	Scope 1 emissions decreased by 2.3% compared to 2022 mainly due to lower hydrocarbon production during the year, and the use of more accurate emissions accounting methodologies for dynamic data at gas processing facilities.
	Scope 2 emissions (market-based) (million metric tons of CO ₂ e)	13.0 ^{**2}	10.3 ^{**2}	Scope 2 emissions (market-based) increased 26.2% and Scope 2 emissions (location-based) increase 13.0% compared to the previous year primarily due to the inclusion of the Jazan Refinery (stabilized units) in the 2023 GHG emissions inventory.
	Scope 2 emissions (location-based) (million metric tons of CO ₂ e)	18.2 ^{**2}	16.1 ^{**2}	
	Upstream carbon intensity (market-based) (kg CO ₂ e/boe)	9.6 ^{**}	9.3 ^{**}	Upstream carbon intensity (market-based) increased 3.2% and upstream carbon intensity (location-based) increased 3.9% compared to 2022, largely due to higher gas production, processing and storage, and lower overall hydrocarbon production.
	Upstream carbon intensity (location-based) (kg CO ₂ e/boe)	10.7 ^{**}	10.3 ^{**}	
	Upstream methane emissions (metric tons of CH ₄)	27,708	29,193	Upstream methane emissions decreased by 5.1% and upstream methane intensity was maintained at 0.05% despite increase in natural gas production. This was enabled by the Company's rigorous Leak Detection & Repair (LDAR) program, along with activities to decrease upstream flaring and enhance energy efficiency which reduce associated combustion related methane emissions.
	Upstream methane intensity (%)	0.05	0.05	
	Flaring intensity (scf/boe)	5.64 ^{**2}	4.60 ^{**2}	Flaring intensity in 2023 was 5.64 ^{**} scf/boe, up from 4.60 ^{**2} scf/boe in 2022, primarily due to increased maintenance and operational activities, as well as the inclusion of the Jazan Refinery (stabilized units) in the 2023 GHG emission inventory.
	Flared gas (MMscf)	27,506 ²	23,818 ²	
	Energy intensity (thousand Btu/boe)	153.8	146.2	In 2023, Aramco's energy intensity was higher than 2022 by 5.2%, this was due to higher energy demand at our operationally controlled affiliates and at Jazan Refinery (stabilized units). Additionally, the increase in gas production, processing and storage impacted the energy intensity, along with lower overall production.
Energy consumption* (MMBtu/hr)	85,649		Metric not disclosed previously, therefore no prior year comparative.	

■ Full metrics table on page 102

Our contribution to the UN SDGs



To support lower GHG emitting and more affordable energy, we are investing in 12 GW in solar and wind energy by 2030, expanding CO₂ storage capacity (e.g., carbon sequestration) as well as expanding gas production to displace the burning of liquids for power generation in the Kingdom.



Aramco Ventures was ranked as a Top-10 Climate Investor globally by Climate50¹. Aramco invests in lower-carbon-emitting energy and materials and in finding solutions to the climate challenges through its \$1.5 billion Sustainability Fund. This is expected to create jobs and contribute to economic growth.



As a major producer of oil and gas with one of the lowest upstream carbon and methane intensities among its industry peers, Aramco maintains its goal of mitigating and reducing GHG emissions across its wholly-owned operated assets through a range of initiatives, which include investments in innovative technologies. These efforts also ensure that we align with the Kingdom's ambitions on climate change.



In 2023 we planted 1.1 million native trees, and approximately 6.5 million mangrove trees in-Kingdom, bringing the cumulative total to 4.1 million native trees and over 30 million mangrove trees.



Aramco is collaborating with research centers and industries, aiming to find solutions for climate challenges, and partnering with organizations with a climate focus, such as the OGDC, OGCI, Ipieca and WEF, as part of a wide range of government and private sector collaborations across numerous industries.

* Metric reported for the first time externally.

** This figure has undergone external limited assurance in accordance to the ISAE 3000 (revised). The assurance report can be found [online](#) on the Sustainability section of our website.

- Acknowledging leading Climate Tech investor (Climate50).
- Jazan Refinery was excluded from our GHG reporting in 2022 and 2021. In 2022, we began reporting associated energy metrics. In 2023, in addition to the energy metrics, the stabilized units of Jazan Refinery were included in our GHG emissions and flaring metrics reporting.

Climate change and the energy transition continued

Our approach to climate change

As one of the world’s largest integrated energy and chemicals producers, we have scaled our operations to meet growing energy demand across the world, which has been driven by economic growth.

Aramco is always seeking ways to improve environmental performance by implementing projects to enhance energy efficiency and mitigate GHG emissions.

This forms an essential component of supporting the Kingdom’s target of net-zero by 2060, and our Company’s ambition to achieve net-zero Scope 1 and Scope 2 GHG emissions across our wholly-owned operated assets by 2050.

Our strategic focus is on developing and deploying innovative solutions, optimizing operations, and adopting efficient project designs that aim to mitigate our emissions. We have allocated financial, technological, and human capital to invest at scale to deliver these plans and ambitions. Innovation and new ways of thinking are driven by all levels of Aramco.

Climate change risk and mitigation

Climate change is a top corporate priority for us and we assess this on a medium- to long -term horizon. Our response to climate change is embedded in our business strategy, supported by our climate change and energy transition framework and our five GHG mitigation levers (energy efficiency, flaring and methane reduction, carbon capture and storage, renewables, and natural climate solutions and offsets).

Risk ¹	Mitigation
Policy: Policies restricting or banning use of fossil fuels, or applying a cost on carbon	<ul style="list-style-type: none"> Climate-related demand scenarios, leveraging our lower carbon intensity and GHG mitigation initiatives, to inform business decision making
Technology: Adoption of disruptive technologies and/or slow development of GHG reduction technologies	<ul style="list-style-type: none"> Accelerated development of our technology portfolios, including synthetic fuels, lower-carbon hydrogen production, liquids-to-chemicals, CCUS and CCS technologies
Market: Loss of demand for hydrocarbons as customers move to achieve their GHG targets	<ul style="list-style-type: none"> Diversification into lower GHG emitting products with longer life cycles, e.g., chemicals and materials supporting the energy transition
Legal: Potential exposure to climate-related litigation	<ul style="list-style-type: none"> Accurate and transparent reporting and disclosures with independent assurance.
Reputation: Impact on corporate reputation	<ul style="list-style-type: none"> Stakeholder engagement, including independent external consultants and subject matter experts to advise on reporting and disclosures, and explain the Company’s energy transition pathway

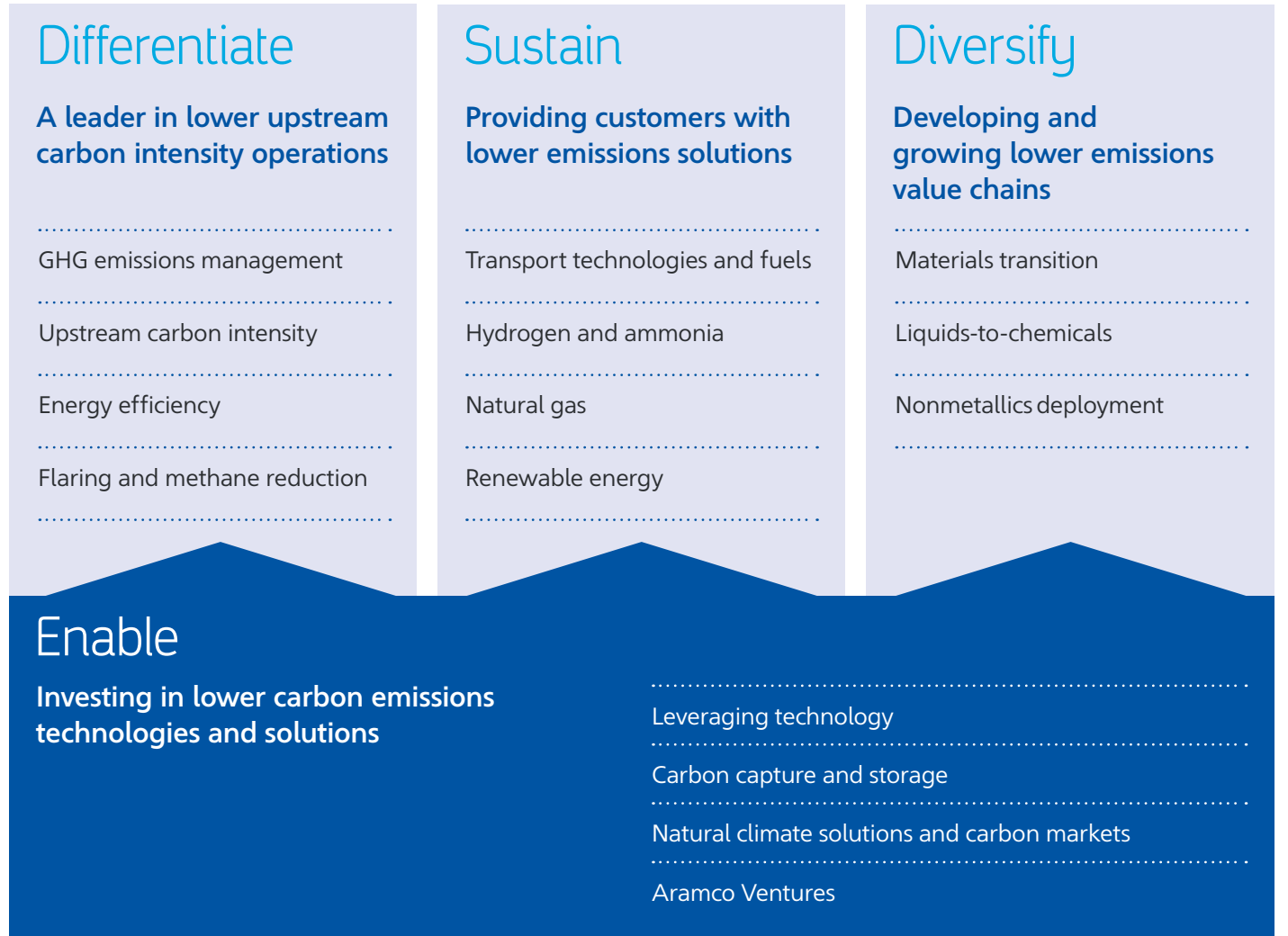
1. For more details, view “Managing Risk Exposure” section of the 2023 Aramco Annual Report.

Our climate change and energy transition framework

Our corporate strategy anchors on four strategic themes, two of which are upstream preeminence and lower-carbon initiatives, where we produce hydrocarbons that have one of the lowest upstream production costs and one of the lowest carbon intensities per barrel of oil equivalent in the world, while working with customers along the value chain to offer products that support their ambitions for the future.

Our climate change and energy transition framework is informed by the circular carbon economy principles of reduce, reuse, recycle, and remove.

We have four pillars that provide the framework for our climate change initiatives and investments:



A leader in lower upstream carbon intensity operations

Our upstream low carbon intensity provides Aramco with an inherent competitive advantage in the future energy landscape. It is the result of our unrivaled initiatives, which start at the subsurface.

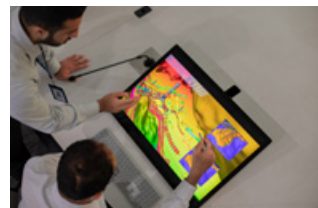
These endeavors range from how we manage our reservoirs and the technologies we use to aid in water management, to our investment in megaprojects, infrastructure and digital solutions which help us reduce and manage our emissions at the surface.

Oil and gas reservoirs are thousands of feet below the surface. They are complex, made of different rocks and fluids, and are therefore dynamic. The technologies it takes to map, navigate and target specific zones in the subsurface is our specialty.

We devise field development plans to ensure the health and sustainability of our reservoirs using the latest technologies, while keeping our energy and emissions intensity in mind.

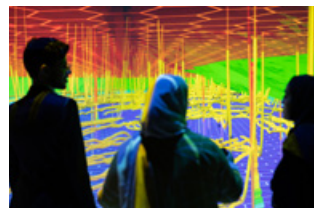
Managing emissions begins at the subsurface

All of our production strategies have enabled outstanding water management performance throughout our reservoirs over many decades. Produced water management plays a key role in lowering carbon intensity, by reducing energy demand to lift fluids, separate, treat, and dispose or reinject the produced water.



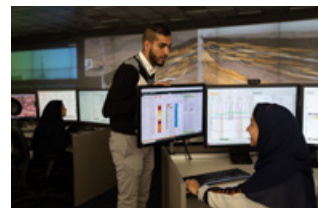
Sustainable reservoir management

Our philosophy of sustainable reservoir management is what sets us apart. Instead of maximizing production from our fields, we prioritize the long-term health of our reservoirs, and opt to produce at lower rates, which prevents premature water breakthrough and can potentially and irreversibly damage reservoirs.



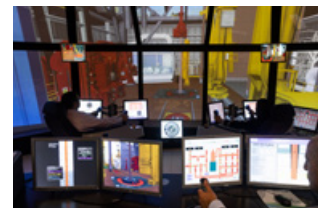
Advanced reservoir modeling (TeraPOWERS)

To optimize our well placement and field development plans, we use advanced simulators, such as TeraPOWERS, which can predict water movement within the reservoir and help to optimize production efficiency.



Geosteering and multilateral wells

Using real-time data, our engineers and scientists can steer multilateral wells with maximum reservoir contact, resulting in precise well placement. This helps target hydrocarbon zones, while minimizing the energy-intensive production of associated water.



Advanced smart well completions

Our production wells utilize advanced valves and devices, which can detect and manage unwanted water production at the subsurface. This reduces power consumption and CO₂ emissions.

Investing in infrastructure, technologies, and digital solutions

Our investments in infrastructure to capture and reduce flared gas, along with our continuous development and deployment of digital solutions to monitor, manage, and reduce our energy intensity and flaring emissions sets us apart from most producers. In 2019, Aramco was benchmarked¹ with the lowest energy intensity among major oil and gas producers, and we have maintained a flare volume of <1% of total raw gas production since 2012.



Master Gas System

Launched in 1975, the Master Gas System is one of the biggest projects in Aramco's history, and has been integral to transforming the Kingdom's energy mix. The system allows the Company to utilize the gas it produces, rather than flaring it, and has resulted in an estimated annual avoidance of flared gas equivalent to 100 MMtCO₂e a year.



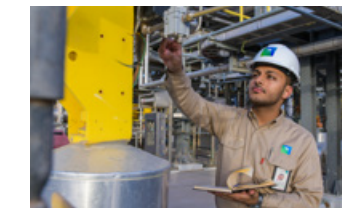
Flare gas minimization and recovery

All our facilities have flare minimization roadmaps, and many of our plants are equipped with Flare Gas Recovery (FGR) systems to further reduce flaring.



Digital solutions and real-time monitoring

Aramco deploys a vast array of digital solutions to optimize energy efficiency, including technologies of the Fourth Industrial Revolution (4IR), such as cloud computing, AI, and Big Data. These solutions allow us to monitor and mitigate flaring, reduce CO₂ emissions, and enhance productivity.



Leak Detection & Repair (LDAR)

The LDAR is a robust program to proactively monitor and repair methane leaks. Millions of points are surveyed annually in every producing facility to ensure that we identify and swiftly repair any potential leaks. This is one of the reasons we achieved and continue to maintain our low upstream methane intensity (0.05%).

1. Benchmark by Solomon Associates

Our net-zero ambition

Aramco's ambition is to continue to mitigate GHG emissions from our operations and achieve net-zero Scope 1 and Scope 2 GHG emissions by 2050 across our wholly-owned operated assets. We know that meeting our net-zero ambition while continuing to meet global energy demand will be a huge challenge.

Aramco is leveraging its R&D and technology initiatives to develop and implement innovative approaches that could help lower emissions across our industry and have potential application in other industries.

GHG emissions

We are aiming to abate 52 MMtCO₂e per annum by 2035 from our wholly-owned operated assets compared to our business-as-usual 2035 forecast emissions. This abatement will be achieved through energy efficiency projects, flare and methane minimization, carbon capture and storage, increasing renewable energy use, including the use of natural climate solutions, and using offsets to address hard to abate emissions in our operations.

The Company's GHG emissions management program monitors Scope 1 and Scope 2 emissions from wholly-owned operated assets, in a manner consistent with the GHG Protocol. As we strive for continuous improvement in our Sustainability Reporting, we have updated our methodology in line with the most up-to-date reporting guidance, with a view to enhance transparency and accuracy, and ensure we provide relevant data. To this end, we have adopted a market-based methodology approach alongside our location-based approach to calculate applicable GHG emissions to provide a more accurate inventory.

Under the market-based methodology, for 2023 our Scope 2 emissions are 13.0** MMtCO₂e (as compared to 18.2** MMtCO₂e under a location-based method).

Our 2035 interim ambitions and associated GHG emissions mitigation levers have been developed for Scope 2 emissions based on a market-based approach.

Aramco plans to report both location-based and market-based approaches to ensure transparency in comparison with previous years.

Total Scope 1 and Scope 2 emissions¹
(million metric tons of CO₂e)



Upstream carbon intensity¹
(kg CO₂e/boe)



In 2023, total Scope 1 and market-based Scope 2 GHG emissions increased by 2.0%, equivalent to 1.3 MMtCO₂e in 2023 compared to the previous year. Scope 1 emissions decreased by 2.3% compared to 2022 mainly due to lower hydrocarbon production during the year, and the introduction of a revised CO₂ venting emissions methodology for gas processing operations to account for dynamic CO₂ concentrations, resulting in a more accurate accounting methodology. Scope 2 emissions (market-based) increased by 26.3% compared to the previous year primarily due to the inclusion of the Jazan Refinery (stabilized units) in the 2023 GHG emissions inventory, and an increase in gas production.

In 2023, we completed bottom-up assessments of our assets, to better identify and prioritize opportunities to meet our interim and 2050 climate ambitions. These assessments are supported by ongoing efforts including energy optimization and energy efficiency.

Upstream carbon intensity

An important metric for Aramco is the carbon intensity of upstream operations, which is among the lowest relative to major crude oil producers per barrel of oil equivalent and has been achieved through effective reservoir management, a low depletion rate operational model, and a focus on energy efficiency.

Our 2035 upstream carbon intensity target of 15% reduction from a 2018 baseline remains unchanged. Adopting a market-based methodology, our target is now 7.7 kg CO₂e/boe (using the 2018 baseline of 9.1 kg CO₂e/boe). Under our previously reported location-based methodology, the target was 8.7 kg CO₂e/boe (using the 2018 baseline of 10.2 kg CO₂e/boe).

In 2023, our upstream carbon intensity (market-based) was 9.6** kg CO₂e/boe (as compared to 10.7** kg CO₂e/boe under location-based method), and increased 3.2% compared to 2022, largely due to lower upstream production and other operational activities, including increased gas production and storage.

Gas is more energy and carbon intensive to produce, yet it provides lower emitting fuel for the power sector when displacing liquids. The storage of gas which commenced in 2023, impacts the upstream carbon intensity. The gas which is produced and stored is removed from the volume of hydrocarbon marketed, and thus increases the upstream carbon intensity.

** This figure has undergone external limited assurance in accordance to the ISAE 3000 (revised). The assurance report can be found [online](#) on the Sustainability section of our website.

1. The 2023 and 2022 figures for Scope 2 emissions and upstream carbon intensity are reported using the market-based method. The 2021 figures for Scope 2 emissions and upstream carbon intensity are based on the location-based method.
2. The Jazan Refinery is excluded from our GHG reporting in 2022 and 2021. In 2023, only the stabilized units of Jazan Refinery are included in our GHG reporting.



As part of our ongoing initiatives to address carbon intensity we have delivered a first pilot shipment of 2MM bbl of Arabian Light crude oil with a product level carbon emissions. This first shipment entailed the calculation of a total carbon intensity of 6.39** kg CO₂e/boe, of which the production and loading stages were 2.42** kg CO₂e/boe, demonstrating the inherent competitive advantage of our lower upstream carbon intensity.

Value chain emissions

While our focus is on the management of GHG emissions from our wholly-owned operations that are within our direct control, we also support the energy transition through developing technologies that aim to lower-GHG emissions.

Our investment in hydrogen, chemicals, and renewable energy sources and the increasing share of gas in our production are intended to provide lower emissions products and energy to our customers. We continue to invest in a number of product stewardship partnerships and technologies to reduce emissions, including research and development into lower emissions transport solutions.

Our \$1.5 billion Sustainability Fund, which invests in breakthrough technologies and startups to find solutions to complex climate challenges, is evidence of our holistic approach and support to the energy transition.

** This figure has undergone external limited assurance in accordance to the ISAE 3000 (revised). The assurance report can be found [online](#) on the Sustainability section of our website.



Sustainability in action

The Oil and Gas Decarbonization Charter (OGDC) launches at COP28

In December 2023, the United Arab Emirates' COP 28 Presidency and the Kingdom of Saudi Arabia established the landmark Oil and Gas Decarbonization Charter (OGDC). Aramco played a key role in the development of the OGDC. The objectives of the charter are to align the oil and gas industry on various key areas, which include:

- Aiming to reach net-zero emissions (Scope 1 and 2) for operations under control by 2050;
- Aiming for near-zero upstream methane emissions by 2030; and
- Aiming for zero routine flaring by 2030.

Signatories of the OGDC included than 50 companies that represent more than 40% of global oil production.

For more information please click [here](#).

Differentiate | Sustain | Diversify | Enable

Levers to meet our interim climate ambition

To mitigate 52 MMtCO₂e from our business as usual emissions by 2035, we are focusing on five key levers: energy efficiency across our upstream and downstream assets; further reductions in methane and flaring; increased use of renewable energy sources; CCS; and development or purchase of offsets to help address hard-to-abate emissions.

In 2023, detailed studies at the asset-level were completed, and have enabled Aramco to update the mix of abatement opportunities across all five levers while also supporting our 2035 mid-term ambition and its associated abatement of 52 MMtCO₂e. Furthermore, the redistributed mix of abatement across levers optimizes cost and capitalizes on synergies.

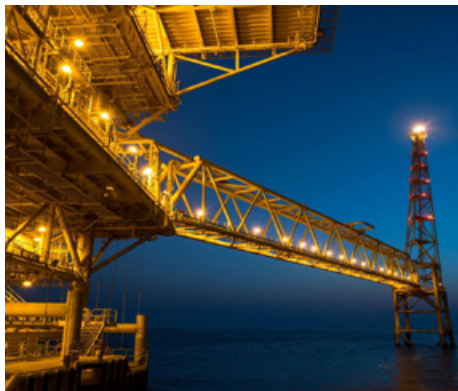
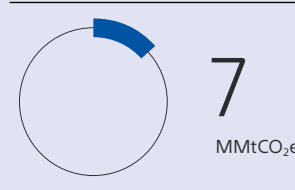


Energy efficiency

Since energy efficiency continues to be at the heart of our work at Aramco, the planned abatement associated with energy efficiency has been refined from 11 MMtCO₂e to 7 MMtCO₂e. This reduction can be attributed to the detailed studies at the asset level completed in 2023 and Aramco's long-standing Energy Management Program, which started in 2000 and has achieved a cumulative emissions reduction of 31.43 MMtCO₂e.

Our actions in 2023

- Implemented 110 energy efficiency initiatives resulting in energy savings of 6,700 boed, and the avoidance of 0.73 MMtCO₂e
- Implemented an ambitious cogeneration transformation program to improve operational efficiency reducing corporate energy intensity by 23% and recognized as a best practice case study by the World Economic Forum
- Developed an advanced energy demand forecasting solution for 26 operational facilities
- Optimization of operation and controls for gas processing, gas turbines, and compressors
- Enhanced boiler and pump efficiencies
- 40 Aramco organizations have received the ISO 50001 certification for their energy management systems

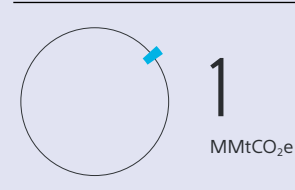


Flaring and methane

Aramco is among industry leaders in both upstream methane and flaring intensities due to decades of investments in digital and engineering solutions.

Our actions in 2023

- 8.9 billion scf of flare gas was recovered in 2023 due to more efficient operations of FGR systems across several facilities
- Maintained upstream methane intensity of 0.05% despite expansion in gas production
- Enhancements in flaring minimization roadmaps resulted in avoidance of 527 MMscf from Midyan and Uthmaniya Gas Plants
- As part of Leak Detection & Repair program, millions of components were surveyed across our facilities to identify potential methane leaks and 1,800 repairs were conducted.
- Deployed a satellite methane monitoring campaign for key upstream assets to monitor methane emissions

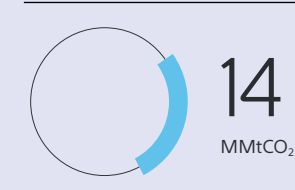


Carbon capture and storage

Aramco is advancing technologies for both CO₂ capture and storage, and investing in world-scale CCS capabilities. We plan to store up to 14 MMtpa by 2035 – contributing towards the Kingdom reaching its goal of 44 MMtpa of CCUS by 2035.

Our actions in 2023

- The CCS lever has been increased from 11 MMtCO₂e to 14 MMtCO₂e, as Aramco is seeking opportunities from scope-optimization to enhance the CCS lever
- Continued development of CCS, Aramco has a target to store 14 MMtpa by 2035, of which 6MMtpa is planned at the Jubail CCS Hub. Phase 1 of the project targets to store up to 9 MMtpa by 2027, of which 6MMtpa is dedicated to Aramco and 3MMtpa to non-Aramco facilities
- Piloted a novel CO₂ geological sequestration solution in collaboration with KAUST, using in-situ mineralization by injecting in basalt formation, permanently converting CO₂ into carbonate rocks
- Established collaboration with Siemens Energy to develop a Direct Air Capture unit in Dhahran. The unit is expected to be completed later in 2024

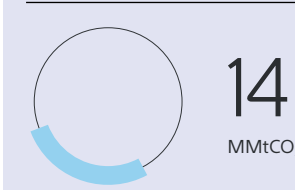


Renewables

Aramco has a target to invest in up to 12 GW of solar and wind energy by 2030, and is exploring for geothermal energy in the Kingdom. We are also investing in advancing renewables technology.

Our actions in 2023

- Reached full capacity and commercial operation at the Sudair Solar PV plant, one of the largest solar plants in the region with a capacity of 1.5 GW¹, in January 2024
- Entered into an agreement for two solar PV projects – Al Shuaibah 1 and Al Shuaibah 2, which will generate an aggregate capacity of over 2.7 GW¹ of renewable electricity. Commercial operations are expected to commence in 2025
- Continued exploring geothermal energy opportunities and identified three potential areas on the west coast of Saudi Arabia
- Deployment of solar PVs as the power source in remote drill sites and offshore platforms

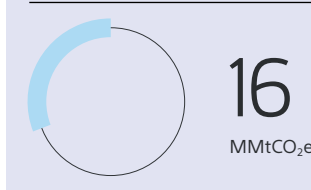


Natural climate solutions and offsets

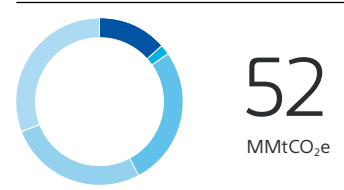
Aramco continues to assess opportunities to expand our in-Kingdom mangrove planting efforts and is now evaluating the suitability of inland mangrove planting within the Kingdom. Beyond this, Aramco is evaluating additional opportunities for planting mangroves outside the Kingdom, and will continue to complement our plantation efforts with high quality carbon credits as feasible to build a portfolio of carbon offsets that aim to address hard-to-abate emissions.

Our actions in 2023

- Planted approximately 6.5 million mangrove trees in-Kingdom, which brings the cumulative total to over 30 million mangrove trees. Third-party validated total carbon stock of planted and existing mangroves equals nearly 445,000 tons of CO₂e cumulatively since we started our mangroves plantation in 1993
- Participated as a lead bidder in the largest voluntary carbon credit auction in Nairobi, Kenya and purchased one million credits of recent vintages
- Retired around 500,000 carbon credits, equivalent to 0.5 MMtCO₂e, against corporate emissions



GHG emissions mitigation by 2035



1. For solar energy projects: Sudair solar plant's capacity 1.5 GW AC is equal to 1.8 GW DC; capacity of Al Shuaibah 1 and Al Shuaibah 2 solar PV projects is 2.7 GW AC, which is equivalent to 3.2 GW DC.

Energy management and energy efficiency

Aramco started its energy management program to improve energy performance in 2000. Since 2013, Aramco operations' energy intensity has improved by 13.4%. In 2022, we expanded the reporting of our energy intensity metric by including our operationally controlled affiliates both global and in-Kingdom.

In 2023, Aramco's energy intensity was 5.2% higher than in 2022. It is noteworthy that the accounted increase in energy demand is not coupled by an increase in accounted production associated with refineries and some affiliates. There was a 6.5% increase in energy demand at our operationally controlled affiliates. Additionally, Jazan Refinery's stabilized units were also added to the measured energy demand in 2023. The increase in gas production, processing and storage² impacted the energy intensity, along with lower overall production.

Energy efficiency actions:

- Commissioning of combined cycle steam turbine generator at Shaybah Producing facility avoiding 75.6 MtCO₂e per year;
- Reduction of steam reserve at Abqaiq Plants avoiding 44 MtCO₂e per year;
- Optimization of chilled-down operation at Berri Gas Plant avoiding 22.6 MtCO₂e per year;
- Energy Efficiency Enhancement Study to optimize power demand at Manifa field resulted in 552 MWh electricity reduction in 2023 equivalent to 0.38 MtCO₂e per year;

40

Aramco organizations received ISO 50001 certification for their energy management systems

Cogeneration plants, operational energy optimization, equipment load management, and upgrades to more energy-efficient equipment have all contributed to improving energy performance.

Energy intensity¹ (thousand Btu/boe)



- Continued optimizing HVAC and controls in buildings to enhance energy efficiency; and
- 40 Aramco organizations have received the ISO 50001 certification for their energy management systems.

For the non-industrial sector, Aramco is embarking on Energy Performance Contracting (ESCO) initiative to accelerate enhancing the energy performance of its built environment. Phase-I of the ESCO deployment has been completed by awarding and signing the Aramco's first ESCO pilot project for the Dammam Office Buildings. Accordingly, energy savings quick wins in 100 targeted buildings were completed as a prerequisite to commence Phase-II of ESCO deployment in these buildings. The Phase-II is expected to be completed by 2025.

Cogeneration

Our investments in cogeneration facilities have contributed to significant improvements in energy efficiency for both our operations and the national grid, where we export some of the generated power. Highly efficient cogeneration plants enable us to produce electricity for our operations utilizing what would otherwise be wasted heat/energy, and are enabling self-sufficiency in electrical power generation for our own operating plants. We analyze the real-time data of the power generated, which allows us to further enhance energy efficiency.

We are harnessing what would otherwise be waste energy by maximizing the conversion of energy released from the combustion of fuel into power and steam to achieve improved thermal energy efficiency and reduce overall GHG emissions. In 2023, we achieved an average thermal efficiency of 71.0% (70.7% in 2022) in our interconnected cogeneration facilities. Several energy optimization studies were carried out for the existing facilities and capital projects. The studies identified energy efficiency initiatives including optimum driver options, heat integration, and deployment of waste heat recovery technologies.

Although having a large fleet of cogeneration plants (fleet size 8MW) significantly reduces the Kingdom's overall GHG emissions, it contributes to our Company's Scope 1 emissions as not all generated power is consumed by Aramco, but some is exported to grid, lowering the Kingdom's overall grid emission factor.



Award

Safaniya Offshore Producing and Uthmaniya Gas Plant win the Clean Energy Ministerial Energy Management Leadership Award

The Global Energy Management Leadership Awards recognize leading organizations for their energy management achievements and raise the profile of the ISO 50001 energy management systems as a proven, broadly applicable solution to global energy and climate change challenges.



Sustainability in action

Aramco's cogeneration facilities recognized by the World Economic Forum

According to the World Economic Forum, the global manufacturing and production sector is responsible for nearly 20% of global carbon emissions, making it crucial for industries to increase energy efficiency to reduce GHG emissions and preserve resources.

Aramco has historically relied on Saudi Arabia's national power grid for power. In order to drive operational efficiency improvements across our operations, we are implementing an ambitious cogeneration transformation program to improve operational efficiency, by utilizing the energy of waste heat, thereby reducing energy consumption from the Kingdom's national grid.

The program has installed 17 high-efficiency cogeneration facilities, reducing CO₂ emissions by approximately 7 million tons annually between 2011 and 2022, and lowering corporate energy intensity by 23%.

This initiative was selected as a best-practice case study in reducing industrial energy intensity in the World Energy Forum's whitepaper titled Transforming Energy Demand. The whitepaper highlights Aramco's 'Lead by Example Program', which has improved energy efficiency in non-industrial sectors like communities, buildings, and transportation services by retrofitting low-efficiency assets, resulting in a 27% reduction in non-industrial energy sector use.



Sustainability in action

Embracing 4 IR to become even more energy efficient

Aramco has developed an advanced Energy Demand Forecasting Solution. The solution utilizes the latest 4IR digital capabilities such as artificial intelligence, advanced analytics, and machine learning for the purpose of forecasting the future energy demand and associated CO₂ emissions in our industrial facilities, with an accuracy of up to 99%. This forecasting solution will help develop strategies to enhance future energy performance, while reducing associated CO₂ emissions.

Highlights

- Reducing corporate energy intensity by 1% -1.2% through effective monitoring and target setting at facilities where Energy Demand Forecasting Solution is implemented.
- Supporting corporate GHG emissions mitigation and digitization efforts
- Up to 99% prediction accuracy of energy demand based on production plans

This solution was developed for 26 operational facilities.



** This figure has undergone external limited assurance in accordance to the ISAE 3000 (revised). The assurance report can be found [online](#) on the Sustainability section of our website.

1. As we progress on our reporting journey and our controls around ESG data mature, for this metric from 2022 onwards, we have expanded the reporting boundary from Company in-Kingdom to operational control. The 2021 figure is at a Company in-Kingdom level only.

2. The activity of compressing sales gas for injection and storage underground increases energy demand, while gas storage decreases sold hydrocarbon going into the calculation, increasing the reported energy intensity.

Flaring

Although flaring is required at oil and gas processing facilities for safety purposes, for decades we have been creating solutions to reduce such flaring, from larger infrastructure such as our Master Gas System and installing flare gas recovery systems at many of our plants, to developing innovative digital solutions.

Our flare monitoring system is one example. It addresses the challenges related to monitoring and reducing flares. The solution provides Company-wide, real-time monitoring capabilities of all flare sources at an asset level.

Our flaring intensity in 2023 was 5.64** scf/boe, up from 4.60** scf/boe in 2022, primarily due to increased maintenance and operational activities, as well as the inclusion of the Jazan Refinery's stabilized units in the 2023 GHG emission inventory and flaring metrics reporting.

Highlights

- Aramco FGR systems in several facilities were performing with high availability and reliability which resulted in the recovery of 8.9 billion SCF of flared gas in 2023.
- Continuous implementation of Flaring Minimization Roadmaps, which lay out site-specific priorities across Aramco operations to further reduce flaring. In 2023, the roadmaps resulted in avoidance of 527 MMscf from Midyan and Uthmaniya Gas Plants.
- Investing in and developing innovative flaring reduction technologies.
- Implementing new FGR projects for applicable operational facilities – a major technology for flare minimization. The implementation and further enhancement of FGR system at Fadhli Gas Plant and Manifa Producing Plant avoided flaring of 1,396 MMscf.

Flaring intensity (scf/boe)



Flared gas (MMscf)



Award

Khurais Producing Department wins the 2023 SEAL Business Sustainability Award

Khurais received the international Sustainability, Environmental Achievement and Leadership (SEAL) Business Sustainability Award¹ for their initiatives on GHG emissions mitigation, water conservation, and granted patents. Obtaining such recognition, is a continuation of Khurais's journey to reduce emissions, leveraged by the department's workforce and advanced technologies.

Methane

Methane is a potent GHG with a higher global warming potential than CO₂ and thus managing it is a priority for Aramco and the oil and gas industry.

As part of the OGCI, members set a target to reduce methane emissions from oil and gas operations. We have surpassed the 2025 OGCI target of well below 0.20% already (we are at 0.05%) and continue to take actions to further drive down our methane intensity.

Our upstream methane emissions decreased by 5.1% despite an increase in natural gas production. This was due to cumulative process efficiency enhancements, including the installation of FGR systems, high efficiency flare systems and adoption of strict Flare Minimization Plans to reduce flaring volumes and the rate of process gas sent to the flare, thereby maintaining optimal combustion efficiency at

flare headers and reducing methane emissions. Other process enhancements included application of Advanced Process Control (APC) systems to optimize system efficiency and energy demand, minimizing fuel gas consumption and associated combustion related methane emissions.

Furthermore, our comprehensive Leak and Detection and Repair (LDAR) program contributes significantly to reducing fugitive methane emissions through the systematic identification and repair of continuous minute gas leaks. This year all Upstream assets were surveyed and millions of components were monitored to identify equipment that need repairs.

A total of 1,800 repairs were conducted in 2023 for both Upstream and Downstream assets. The reduction in absolute methane emissions is also attributed to enhancements in the methane emissions methodology to account for actual activity data, and the ongoing LDAR program.

GHG Satellite Monitoring

Aramco is constantly seeking ways to enhance GHG emissions monitoring and mitigation. The GHGSat Satellite Constellation, a network of satellites, is currently being deployed after extensive trials and a program launched in 2023 to identify and monitor methane emissions from Aramco's in-Kingdom operations. As part of our aim to monitor emissions, we are using this cutting-edge space-based sensor technology to identify and mitigate emissions sources at a very detailed level of accuracy while supporting LDAR activities.

Upstream methane intensity (%)



Upstream methane emissions (metric tons of CH₄)



Sustainability in action

Haradh gas plant reduces flaring by 11%

Haradh gas plant reduced plant flaring by 11% as a result of the following initiatives:

- Purge gas optimization study.
- Optimized the Hydrocarbon Thermal Oxidizer maintenance duration and reduced the flared amount during the maintenance by 70 MMscf.
- Mitigated leaks from flare control valves.
- Deployed online cleaning methodology for stabilization system reboilers that eliminate equipment isolation and depressurization.



Sustainability in action

New methane emissions detection technology piloted

In 2023, two new technologies were piloted at Hawiyah NGL Plant for continuous monitoring of methane emissions:

- A Tunable Diode Laser Absorption Spectroscopy Methane Detection System
- A remote sensing Fourier Transform Infrared spectroscopy system.

The newly piloted technologies will further increase our expertise in the field of continuous methane emission monitoring, while enhancing our performance in the LDAR Program, and prioritizing methane mitigation actions at our operating facilities. Continuous methane monitoring is a fast-evolving field in the oil and gas industry with multiple new emerging methane detection and quantification technologies.



** This figure has undergone external limited assurance in accordance to the ISAE 3000 (revised). The assurance report can be found [online](#) on the Sustainability section of our website.
 1. The Jazan Refinery is excluded from our GHG and flaring reporting in 2022 and 2021. In 2023, only the stabilized units of Jazan Refinery are included in our GHG and flaring metrics reporting.

Providing customers with lower emissions solutions

Fuels and transport technologies

Transportation is a core element of the energy transition. Aramco is exploring the development of synthetic fuels that produce lower GHG emissions and maintain the same levels of performance. Aramco's lower carbon intensity crudes and investment in GHG emissions mitigation initiatives in our refineries enable production of fuels with lower embedded carbon. We are also exploring ways to improve the efficiency of the internal combustion engine.

We recognize that achieving successful GHG emissions mitigation of the automotive industry necessitates a combination of various technologies. These could include highly efficient internal combustion engines (ICE), hybrid, synthetic fuels, hydrogen, and electric vehicles (EVs). To effectively reduce GHG emissions from transportation, it is crucial to invest in enhancing the efficiency of ICE vehicles, considering that by 2050, approximately 56% of vehicles are expected to still rely on this technology. Lower-carbon emission ICE vehicles and alternative fuels technologies have the potential to reduce emissions by 50-75%. Furthermore, lower-carbon emissions ICE vehicles and alternative fuels technologies are expected to play a key role in lowering GHG emissions in regions where the power grid relies heavily on coal as well as helping to alleviate strains on critical minerals supplies and grid capacity associated with electrification.

Our Transport R&D team have presence all around the world, including in Paris, Detroit, and Shanghai, and our research centers act as technology hubs to leverage the respective innovation ecosystems in each region. Scientists and technologists across the centers are working closely with technology providers and automakers to advance practical solutions for a more sustainable mobility future.

In 2023, at the Bahrain Grand Prix races, Aramco supplied fuels containing 55% bio components for the first competitive use, which were used in Formula 2 and Formula 3 cars. This is a transitional step as the championships work toward ambitions by 2027. Our intention is to introduce synthetic components to the formulation from 2025 onwards.

Aramco and ENOWA, NEOM's energy and water company, signed a joint development agreement to construct and establish a first-of-its-kind synthetic fuel demonstration plant. The project will be located in ENOWA's Hydrogen Innovation and Development Center (HIDC) and aims to demonstrate technical feasibility and commercial viability of synthetic gasoline from renewable-based hydrogen and captured carbon dioxide. The demonstration plant in NEOM is the result of intensive research and development efforts aiming to optimize the production of synthetic fuels.

In Bilbao, Spain, Aramco and Repsol are exploring the production of synthetic diesel and jet fuel for automobiles and aircrafts.

We have also been carrying out extensive research into the potential of algae-based biofuel, and have produced the first batch of biocrude from microalgae. Our efforts are part of a wider exploration of how we can make more use of nature-based solutions in our operations. For example, we are exploring how algae-based products could potentially be used in our upstream operations, including drilling. We are exploring ways to convert algal biocrude into drilling fluids, such as oil-based muds.

Lower carbon aviation fuel

As the global aviation industry works towards addressing its GHG emissions and net-zero ambitions, aviation fuels, notably Sustainable Aviation Fuels (SAF) may account for a 65%¹ share of measures to address this ambition. However, there are current challenges with scaling the production and deployment of SAF required to meet industry targets. For example, the cost of SAF is currently 3 to 5 times the cost of jet fuel and substantial upfront investment costs will be required for SAF facilities.

Aramco is working towards being a provider of lower carbon aviation fuels (LCAF), which have lower carbon intensity compared to the global average for jet fuel and are compatible with existing fueling infrastructure. This could offer a viable transitional and complimentary to SAF solution while also providing the added benefit of having 10% lower GHG emissions compared to conventional jet fuel.

LCAF can be incorporated as a fossil-based aviation fuel that meets the United Nations International Civil Aviation Organization, Carbon Offsetting and Reduction Scheme for International Aviation (CORSA).

Hydrogen and ammonia

Aramco is championing the Kingdom's ambition to be a world-leading producer of efficient fuels, through a plan to produce 11 MMtpa of blue ammonia by 2030. Aramco's CCS development is instrumental to both production of hydrogen and the resulting CO₂ being captured and sequestered, and facilitating the Kingdom's GHG emissions mitigation ambitions.

In 2023, a first shipment of independently-certified blue ammonia was delivered to Japan for use as fuel in power generation with the resulting CO₂ being captured and sequestered.

The shipment was the result of a successful multi-party collaboration across the lower-carbon ammonia value chain. The ammonia was produced by SABIC Agri-Nutrients with feedstock from Aramco, and sold by Aramco Trading Company to the Fuji Oil Company. Mitsui O.S.K. Lines was tasked with shipping the liquid to Japan, then the ammonia with the resulting CO₂ being captured and sequestered was transported to the Sodegaura Refinery for use in co-fired power generation, with technical support provided by Japan Oil Engineering Co.

Ammonia is significantly more convenient, practical and cost-effective than hydrogen in its transport, both in terms of the required temperatures and pressure conditions. We are helping chart a course for this vital commodity, which is also an important energy source in its own right that will help to mitigate GHG emissions in key sectors.



Sustainability in action

Aramco delivers lower carbon aviation fuels

Aramco's jet fuel production in the Kingdom of Saudi Arabia has a lower carbon intensity (CI) than conventional jet fuel compared to the global average and is compatible with existing fueling infrastructure and procedures. In view of addressing GHG emissions in the aviation sector, LCAF is envisaged to hold complementary roles and be a part of the aviation fuel mix along with other alternative fuels such as SAF and synthetic fuels. Aramco has recently completed the validation of the CI of its jet fuel production from some of its in-Kingdom refineries and is subsequently working towards LCAF certification, as per requirements from the Carbon Offsetting and Reduction Scheme for International Aviation (CORSA).



Sustainability in action

Aramco contributes to a credible hydrogen market

The Open Hydrogen Initiative is led by GTI Energy, S&P Global Commodity Insights, and in partnership with the United States Department of Energy to lay the foundation for hydrogen markets by creating objective, peer-reviewed, and open-sourced tools to measure and assess the carbon intensity of hydrogen production at the facility level.

In line with the Company's strategic theme of pursuing lower-carbon initiatives, Aramco is collaborating with more than 40 other organizations spanning industry, environmental NGOs, academia, and government entities to develop a first-of-a-kind framework to advance efforts to reduce carbon emissions of this energy sector and be a player in supporting a transparent, credible, and harmonized hydrogen market.



1. Source: IATA. Net-zero 2050: sustainable aviation fuels (iata.org)



Sustainability in action

Building the first underground gas storage facility in the Kingdom

Raising our gas production is an essential part of our long-term strategy, allowing us to drive emission reductions in the Kingdom by displacing the burning of oil liquids in electricity generation.

However, domestic electricity demand is typically seasonal, with consumption in the peak summer months significantly higher than that in the winter months. To meet this challenge and to avoid the need to use higher emission energy sources to meet short term demand spikes, gas storage is key.

The Hawiyah Gas Compression and Storage Facility – which is based in the middle of the world's largest onshore oilfield – receives gas from our Master Gas System, an extensive network of pipelines connecting Aramco's key gas production and processing sites with customers throughout the Kingdom. The received gas is then compressed and injected underground into the depleted Unayzah reservoir, ready to be stored until needed, at which point it is re-injected into the Master Gas System.

Hawiyah is designed to inject up to a 1.5 bscfd and has the capacity to withdraw up to 2.0 bscfd of the stored sales gas.



Natural gas

Natural gas is a key enabler for the energy transition, as it is highly compatible with intermittent renewable energy for power generation, and provides more efficient power than other conventional forms of non-renewable energy.

Our gas investment is key to the Kingdom's plan to diversify its energy mix by cutting its use of higher emitting liquid hydrocarbons for power generation, and build on the Company's strategy to produce valuable feedstock for the petrochemical industry.

We are supporting the Kingdom's Liquid Displacement Program, which aims to displace about 1 MMboed of liquids by sales gas, renewable deployment and efficiency improvements by 2030. Aramco's Master Gas System Phase III Expansion (MGS III) facilitates this major program by expanding the gas supply capacity to the central and western regions, and extending the network to the southern region. In addition to supplying gas to utility plants, MGS III also extends the network to 11 industrial clusters in the Kingdom, enabling fuel switching, industrial growth, and lowering GHG emissions.

Renewable energy

The Kingdom's utilities sector is positioned to undergo a major transformation driven by the Saudi Green Initiative (SGI), which aims to have 50% of the Kingdom's power generation capacity from renewables, with the balance of 50% from gas. This policy has a multi-fold impact of more efficient power generation for gas compared to liquid burning, and significantly lower-GHG emissions.

Aramco has a pivotal role in facilitating this transition both through the Company's gas expansion plans, and equity participation in Public Investment Fund's (PIF) renewable projects.

The Saudi government has established a National Renewable Energy Program, in 2016, with the goal of increasing the generation capacity of renewable energy sources. Aramco supports the Kingdom on this journey as a part of a partnership with PIF in its renewable energy program.

Solar

In 2023, the 1.5 GW¹ Sudair solar plant, the first project developed by a consortium with PIF and ACWA Power, has received the full commercial operation certification from the power offtaker and the entire contracted capacity is now in full operation.

The consortium has achieved financial close of Al Shuaibah 1 and Al Shuaibah 2 solar PV projects with an aggregate capacity over 2.7 GW¹. The commercial operation for Al Shuaibah projects are expected to commence in 2025. Aramco plans to use the allocation of renewable energy certificates (RECs) from these investments. Aramco continues to assess other opportunities to advance its progress in renewable energy.

Geothermal

We are undertaking activities led by the exploration arm of the Company to evaluate the potential of geothermal energy in the Kingdom.

Three potential locations on the Western coast of Saudi Arabia have been identified and mapped using sophisticated subsurface technologies, and steps are underway to assess the extent of geothermal resources at each location. Alternative potential areas will be considered in the future to add to the Kingdom's portfolio of alternative energy sources.



1. For solar energy projects: Sudair solar plant's capacity 1.5 GW AC is equal to 1.8 GW DC; capacity of Al Shuaibah 1 and Al Shuaibah 2 solar PV projects is 2.7 GW AC, which is equivalent to 3.2 GW DC.

Differentiate | Sustain | Diversify | Enable

Value chains and the materials transition

The materials transition

Reducing emissions in energy generation has been a core focus of climate mitigation efforts to date. However, another key lever to achieving a transition to lower emissions will be that of evolving how we use, produce and dispose of the materials which form the building blocks of the 21st century economy.

This “materials transition” will cover the entire product value chain, and will be critical to meeting surging demand for minerals, metals and materials projected to take place in the coming decades, driven by population and economic growth.

A viable materials transition will be key to unlocking an orderly energy transition by redefining the materials of modern life and mitigating emissions as the world’s energy demand grows.

On the production side, hydrocarbons will be increasingly be used without combustion, providing essential feedstocks to the innovative new materials needed in the energy transition.

For instance, each megawatt of installed solar and wind capacity currently utilizes around 8 to 10 tons of petrochemicals-based materials¹.

Further sustainability will then be achieved through a process of materials circularity, whereby materials and their emissions are recycled and reused both in products and in the form of alternative energy. One notable initiative that Aramco is pursuing in this regard is through the development of an advanced circular polymer through our affiliate, SABIC.

The materials transition creates significant challenges and opportunities, but among the latter is the chance for the chemicals industry to steadily supplement existing materials with more durable and sustainable alternatives, such as polymer- and emerging carbon-based materials.

These alternative materials can help to drive GHG emissions reductions across an array of industries which are reliant on traditional materials such as steel and concrete, including housing, construction, infrastructure and renewables.

To maximize this opportunity, Aramco believes that the chemicals industry must strengthen and accelerate its innovation efforts to continue developing more durable and sustainable materials, at scale, while reducing their cost; and, in the Kingdom of Saudi Arabia, that establishing an advanced materials center

could strengthen and complement existing programs and push the boundaries of innovation through global collaboration.

Material substitution has a high potential to reduce pressure on certain supply chains, given that alternative materials have the necessary properties to suit the given application.

Material substitution is likely to be driven by emission savings and also cost. Durable hydrocarbon-based materials can contribute to reduced carbon emissions compared to most metals.

Examples of material substitution include EV light weighting (reducing the weight of EV by substituting certain structural elements) which can alleviate pressure on battery value chains; and copper substitution with its’ conductive properties used in batteries, cables for grid, solar panels, etc.

Aramco is pursuing a number of initiatives along the value chain to drive this materials transition, leveraging our position as one of the world’s largest integrated energy and chemicals companies.



Award

Yanbu Refinery achieves recognition in the World Economic Forum Global Lighthouse Network

Aramco has received the World Economic Forum Global Lighthouse Network recognition under WEF’s Shaping the Future of Advanced Manufacturing and Production Platform. The award recognizes Aramco’s use of the latest 4IR technologies to help produce energy with lower emissions.

In 2023, Yanbu Refinery was Aramco’s fourth facility to be included, joining the Company’s Abqaiq oil processing and stabilization facility, Uthmaniyah Gas Plant, and Khurais Oil Complex. Yanbu Refinery is one of 21 new facilities added to the prestigious Network which now includes a total of 153 manufacturing facilities around the globe. We are the only international energy company globally to be represented by more than two facilities.

\$7 billion

invested in Shaheen in partnership with S-Oil – a significant step in our liquids-to-chemicals expansion

Liquids-to-chemicals

As part of the wider materials transition, petrochemicals are set to be the primary engine of oil demand growth in the coming years, and Aramco is investing heavily in this sector as we continue to diversify our portfolio into new, lower-emissions value chains.

In 2023, Aramco celebrated the groundbreaking of the \$7 billion Shaheen petrochemical project, in partnership with S-Oil, in South Korea. Shaheen is among Aramco’s biggest international downstream investments, representing a significant and sizeable step forward in our liquids-to-chemicals expansion. It is expected to be one of the largest integrated steam crackers in the world. It is also the first major commercial deployment of Aramco’s thermal crude-to-chemicals technology developed

in collaboration with Lummus Technology that aims to increase chemical yield with less energy intensity. In addition to this, we have continued to advance on our liquids-to-chemicals strategy in Asia, acquiring a 10% interest in Rongsheng Petrochemical in July 2023.

Nonmetallic deployment

Nonmetallic materials reduce carbon emissions by up to 60% compared to equivalent carbon steel solutions. They also promote in-Kingdom value by adding to local nonmetallic product manufacturers and service providers.

Our Unconventional Resources program was the first in the Kingdom to deploy the Reinforced Thermo Plastics (RTP) flowline in sweet gas services covering more than 1,000 km of RTP in flowlines and is deploying further increments; which will reach a total of 15,000 km of RTP lines across all areas of the Kingdom.



Sustainability in action

New materials for lower emission construction solutions

Engineered Cementitious Composites (ECC) are a special class of high-performance fiber-reinforced concrete with many potential uses, as ECC are more ductile than conventional concrete when applied in pavement, pipes, and structure.

Its use has many benefits, for example ECC pavement, for medium-traffic use, is anticipated to have up to 50% lower CO₂ emissions compared to conventional concrete pavement.

Aramco is collaborating with the University of Michigan, where the first demonstration of ECC materials as road pavement has been performed, and Aramco conducted a pilot demonstration in Dhahran as well.



1. Energy Intelligence Whitepaper: Building Blocks of the Energy Transition (October 2023)

Differentiate | Sustain | Diversify | Enable

Investing in lower carbon emissions technologies and solutions

We believe that digital technologies can be a key enabler for Aramco and the energy industry's future by allowing the optimization of operations, and enhancing sustainability. With this in mind, Aramco has established a Digital Sustainability Flagship Program to streamline all the digital efforts across the Company related to climate and sustainability.

Strategic technologies being developed to enable emissions mitigation or displacement include renewables and energy storage, hydrogen production technologies, nonmetallic applications development, Thermal Crude-to-Chemicals deployment at our subsidiary S-Oil, lower-carbon fuels, engine technologies, as well as CCS, including stationary carbon capture and direct air capture.

63%

of total R&D spend was sustainability-related

In addition, as a member of the OGCI, we contribute financially to Climate Investment (CI), an independently managed, specialist investor. Its mission is to drive near-term GHG emissions mitigation through investment and market adoption of our portfolio company innovations across a network of investors and global partnerships. Over the past six years, it has built a portfolio of 36 companies with innovative products and services, operating in the energy, transportation, built environment, and industry sectors.

Research and development

In 2023, sustainability-related R&D was \$540 million, which equated to 63% of total 2023 R&D spend of \$861 million². Our R&D spend encompassed sustainability focused solutions to improve our business and energy efficiency, enhance company circularity, as well as supporting the global energy transition.

In 2023, 20% of the new patents filed were in sustainability technologies, an increase from 15% the year before.

Examples of ongoing R&D initiatives include:

- CO₂ mineralization to calcium and magnesium carbonates utilizing cement and steel waste materials;
- An initiative called PowerSense, which conserves and reduces energy by measuring the amount of electrical flow of each component at the rig;
- In-situ generation of hydrogen in subsurface formations; and
- Development of digital platforms to drive efficiency that can reduce Aramco's GHG emissions.

R&D focus areas	2023 spend (\$ million)	2022 spend (\$ million)
CCS	40.0	41.5
Renewable energy	7.5	6.4
Energy efficiency	71.0	64.8
Waste management and recycling	16.3	32.3
Water management	50.1	32.2
Gas treatment	42.8	40.5
Lower-carbon hydrogen production	57.8	26.4
Sustainable mobility	208.9	136.6
Crude-to-chemicals	16.4	30.3
Nonmetallic applications	29.6	24.2
Total R&D for sustainability technologies^{1,2}	540	435
Total Aramco R&D^{1,2}	861	737
% of sustainability-related R&D out of Aramco R&D spend^{1,2}	63%	59%

1. Includes direct R&D program costs plus estimated overheads.

2. This figure includes Company in-Kingdom plus Global Research Centers, SASREF, Motiva, ATC, ASC, AOC and SAAC.



Carbon capture and storage

With our deep understanding of the subsurface, and utilizing advanced technologies, Aramco continues its journey to become one of the key players in the CCS industry. The Company has continued its efforts to avail CO₂ sequestration capacity, performing several assessments to identify and develop new potential CO₂ storage sinks. Throughout 2023, site screening activities and viability assessments continued with a view to identify potential storage sites through data acquisition programs, including 3D seismic activities.

Jubail CCS hub progress

Following the collection of all the required subsurface data, an advanced 255 million cell simulation model was constructed to drive further optimization in the development plans for the Jubail CCS hub project. Phase 1 of the CCS project aims for up to 9 MMtpa CO₂ by 2027 (from which up to 6 MMtpa will be supplied from Aramco and remaining 3 MMtpa from non-Aramco facilities), supporting the Kingdom's goal to sequester 44 MMtpa of CO₂ by 2035.

Natural climate solutions

Natural climate solutions continue to play a complementary role where emissions abatement is challenging. In line with our interim target to plant 300 million mangroves in-Kingdom by 2035, Aramco planted 6.5 million mangrove trees in-Kingdom in 2023, bringing its cumulative total to over 30 million. These trees have been planted since 1993 when the Company started mangroves plantation trials and experiments at Abu Ali Island. We also had an independent carbon stock assessment done on Saudi Arabia's mangrove plantation initiatives to quantify the carbon sequestered to date of its planted and existing mangroves. A third-party validated the total carbon stock of planted and existing mangroves of almost 445,000 tons of CO₂e.

The majority of mangroves (26.5 million) were planted over the last three years as part of our efforts to develop natural climate solutions as part of our GHG emissions mitigation program. As mangroves mature, they sequester increasingly higher amounts of CO₂, which projects a promising trajectory for CO₂ sequestration by Aramco's mangrove plantations over the coming decades. In 2022 and 2023, Aramco's mangrove plantations sequestered 11,800 and 27,500 tons of CO₂ respectively.

Differentiate | Sustain | Diversify | Enable

Carbon offsets and carbon credits

Aramco supports the use of market mechanisms that address climate change and sustainable development as they offer a balance between driving emissions reductions and supporting economic growth. To be effective, they should cover all emitting sectors and all types of GHG emissions, recognize carbon intensity differentiation, equity, and revenue neutrality, as well as transferability of potential credits.

Aramco retired approximately 500,000 carbon credits in 2023, against a corporate emissions plan to use carbon markets to support the delivery of our 2035 and 2050 emissions mitigation ambition, while directing climate finance towards climate change mitigation solutions. The use of carbon offsets is an important part of

Aramco's net-zero planning as they enable mitigation of hard-to-abate emissions and allow us to accelerate emissions reduction action, particularly where alternatives, such as CCS, are not fully mature and scalable.

In 2023, Aramco developed its Internal Guidelines for Carbon Offsets and Crediting that commit to sourcing high integrity carbon credits. We aim to develop a portfolio approach that could include spot purchases, long-term offtake agreements, and equity investment in projects. Our guidelines seek to balance commercial decisions with optimizing the impact of offsetting. Carbon credits will be retired against corporate emissions, assets, bundled products, or sold to promote third party reductions.

500,000

carbon credits retired in 2023

Due to the absence of an internationally unified standard, we use existing, reputable frameworks and benchmarks to ensure offsets are high quality. These include the Integrity Council's Core Carbon Principles and CORSIA-eligible credits. We have also developed additional internal quality criteria that would allow us to contribute to the Kingdom's NDCs. We intend to invest in projects with diverse economic and social development benefits that promote broader sustainable development goals, such as access to clean and affordable energy, job creation, enhanced biodiversity and women empowerment.

Aramco continues to play a leading and enabling role in supporting the development of the Regional Voluntary Carbon Market Company in Saudi Arabia (RVCMC). We participated in RVCMC's second auction, the world's largest of its kind, with the auctioning of over 2 million CORSIA-eligible and Verra-registered carbon credits, of which one million were purchased by Aramco.

Aramco's Sustainability Fund

At Aramco, we invest in breakthrough technologies and startups to find solutions to complex climate challenges. As hydrocarbons remain a significant part of the world's energy supply, we believe investment should be proportionate to the challenges in ensuring a stable and inclusive energy transition. This is why in October 2022, we launched the \$1.5 billion Sustainability Fund through our global venture capital arm, Aramco Ventures.

During the year, Aramco Ventures invested in UK's OXCCU catalytic technology to convert hydrogen and carbon dioxide into sustainable aviation fuel, in addition to providing financing for Parallel Carbon, a company that uses renewable energy for hydrogen production.

Recently, we have allocated an additional \$4 billion to Aramco Ventures, increasing its total investment capabilities from \$3 billion to \$7 billion between 2024 and 2027.

During the year, Aramco Ventures was named as a Top 10 Climate Investor globally by Climate50¹ an annually published list that aims to recognize the world's top 50 most impactful climate investors, and as a 'Top 100 Innovator in the Energy Transition' by Reuters².

Top 10

Climate tech investor globally

The Sustainability Fund's portfolio includes 27 investments with a total committed amount of \$394 million. In 2023, the Sustainability Fund committed \$239 million and closed investments in 17 companies. This has facilitated innovation in areas like carbon capture, synthetic fuels, and building energy efficiency. The Sustainability Fund is among the largest sustainability focused venture capital funds in the industry.

1. Acknowledged as a leading leading Climate Tech investor (Climate50)
2. Top 100 Innovator in the Energy Transition by Reuters, 2024



Sustainability in action

Aramco's first verified carbon offset crude cargo

In 2023 we launched a strategic initiative for a pilot project to deliver Arabian Light crude oil with a product level carbon emissions intensity and an emissions management plan in line with PAS2060 –using a cradle-to-gate partial lifecycle assessment approach, as the first of its kind in the Middle East.

This first pilot shipment entailed the calculation of total carbon intensity of 6.39** kg CO₂e/boe of which the production and loading stages were 2.42** kg CO₂e/boe. Contributing to the lower carbon intensity of Aramco's pilot shipment were emissions reduction initiatives across relevant facilities and the use of offsets for residual emissions sourced from the Saudi-based RVCM of a certified renewable energy project in the MENA region. Third-party verification was conducted by Lloyds Register Quality Assurance (LRQA) and the corresponding Qualifying Explanatory Statement is available [online](#).

We believe an understanding of product level carbon emissions, alongside GHG emissions reduction initiatives and the optional use of offsets for residual GHG emissions, all third-party verified, can assist stakeholders make more informed decisions.

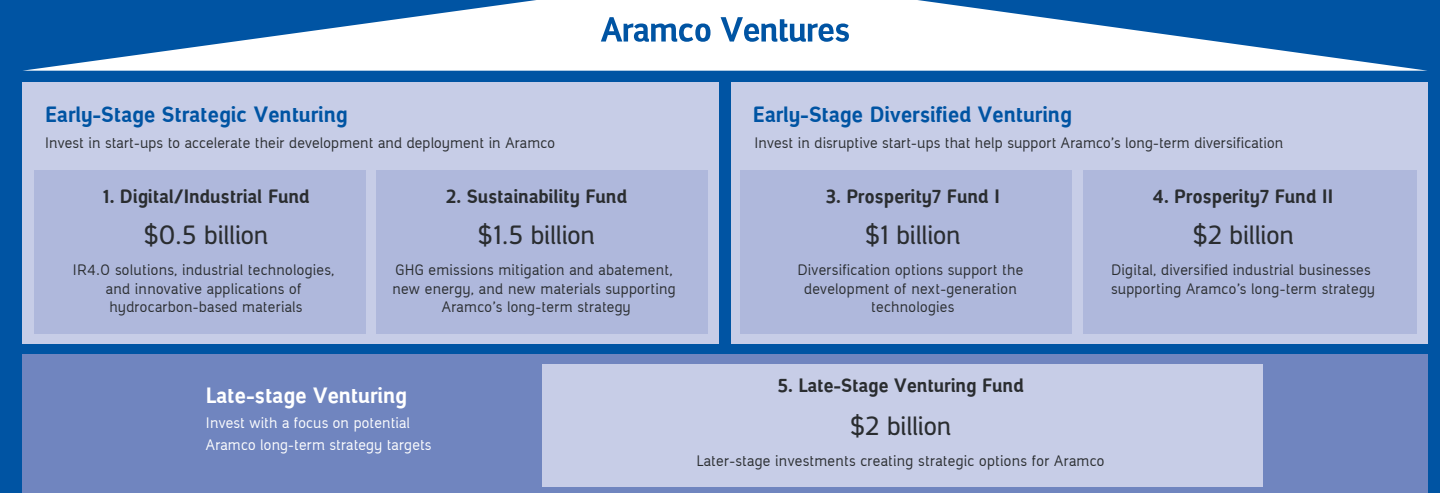
** This figure has undergone external limited assurance in accordance to the ISAE 3000 (revised). The assurance report can be found [online](#) on the Sustainability section of our website.

Spotlight on Aramco Ventures

Impactful climate investing

Aramco Ventures manages five funds. These are a Digital/Industrial Fund investing in technologies of strategic importance to Aramco; the Prosperity7 Funds I and II investing in disruptive technology; the Sustainability Fund, which invests in start-ups with potential to support Aramco's climate ambitions and the Late Stage Venturing Fund supporting later stage investments. Aramco Ventures has offices in Saudi Arabia, the USA, Europe, and China.

Fund Structure
5 Funds under 3 Venturing Programs (\$7 billion)



Supporting the energy and materials transition through developing solutions and products

Lower-carbon Intensive Energy



Lower carbon aviation fuels

Aramco aims to be a provider of LCAF, which have lower carbon intensity compared to the global average for jet fuel and are compatible with existing fueling infrastructure. Aramco is working towards LCAF certification for its jet fuel production from some of its refineries as per the CORSIA requirements. LCAF aims to address the immediate challenges associated with scaling the production and deployment of Sustainable Aviation Fuels required to meet aviation industry targets.



Hydrogen

Hydrogen has a lower life-cycle carbon intensity than traditional fossil fuels and could help reduce emissions in hard-to-abate sectors such as heavy-duty transport and industrial applications. In October 2023, Aramco entered into an engineering agreement with Topsoe to construct a lower-carbon hydrogen production demonstration plant at the Shaybah Natural Gas Liquids (NGL) recovery site in Saudi Arabia. The demonstration plant will use renewable electricity in electrified steam reforming of hydrocarbons to produce hydrogen for use in power generation, with the resulting CO₂ being captured and sequestered.



Renewables

Aramco has ambitious plans to invest in 12 GW of solar and wind energy by 2030, and is also evaluating geothermal energy resources in Saudi Arabia. In efforts to advance renewables, Aramco has developed heat-tolerant flow batteries for storage, integration and efficient use of renewable power in hot environments (temperature over 55°C). Aramco is also developing cost-effective lightweight solar panels by replacing glass front-sheets with transparent polymer-based materials.



Natural gas

Natural gas is expected to serve as a bridging fuel in a transition to a lower GHG emissions future, and is displacing the burning of liquid fuels in the Kingdom. Aramco plans to increase its natural gas production by potentially more than 60% by 2030 compared to 2021 levels with a mix of conventional and unconventional gas. Aramco also made its first international investment in LNG by signing a definitive agreement in September 2023 to acquire a minority stake in MidOcean, an LNG investment vehicle owned by EIG, which is in the process of acquiring Australian LNG projects as part of an initial phase of acquisitions to create a diversified global LNG business.



Ammonia

Converting lower-carbon hydrogen to ammonia is a competitive solution for hydrogen transportation, given ammonia's high volumetric energy density, which makes it cheaper and safer to ship. Aramco has been helping to pioneer the development of a global supply network for ammonia. In April 2023, Aramco, FOC, SABIC AN, MOL, and JOE collaborated to ship the first independently-certified ammonia cargo to Japan for use in power generation. Aramco delivered two other shipments of accredited blue ammonia in 2023 through its affiliates ATC and SABIC Agri-Nutrients.

Carbon capture, utilization and storage



Direct Air Capture

In addition to developing technologies to capture carbon dioxide at the point of emissions, we are also researching and testing solutions to reduce the cost of capturing carbon dioxide directly from the atmosphere, via Direct Air Capture (DAC). Aramco is collaborating with Siemens Energy to develop a DAC test unit in Dhahran, Saudi Arabia. The test unit, which is expected to be completed in 2024, is intended to pave the way for a larger pilot plant. Captured carbon dioxide can be utilized as part of a circular carbon economy.



Carbon capture and storage hubs

If commercially scalable, CCS could be a key technology to enable the Company's emissions mitigation ambitions. Aramco is investing in world-scale CCS capabilities, and will continue development, drilling, and evaluation activities, to establish a wide portfolio of subsurface assets across the Kingdom. In partnership with Linde and SLB, Phase 1 of the Jubail CCS hub is expected to be one of the largest in the world with a capacity of 9 MMtpa. Aramco's share of CO₂ capture from its facilities is set to reach up to 6 MMtpa by 2027.



Mobile carbon capture

Aramco is striving to mitigate the emissions of the internal combustion engine, and our mobile carbon capture technology aims to achieve this by capturing CO₂ at the point of emission. Over the past decade, Aramco Transport Technologies R&D team has road-tested prototypes for an array of vehicles and trucks, generating more than a dozen granted patents and has licensed the technology to Daphne Technology for carbon capture in marine vessels.



CO₂ mineralization

Aramco is developing novel methods for permanently sequestering CO₂ through mineralization. We have demonstrated one such method through a pilot technology that stored up to 200 kg of CO₂ per ton of cement while curing precast concrete at a local plant. Additionally, Aramco and KAUST piloted a novel CO₂ sequestration solution using mineralization, which involves dissolving CO₂ in water and injecting it into volcanic rocks in Jazan, Saudi Arabia. The process permanently converts CO₂ into carbonate rocks.

Materials



Nonmetallics

The energy transition will rely in part on a concurrent materials transition, which will see a massive increase in demand for both existing and alternative materials. Aramco is a producer of nonmetallic materials for the oil and gas industry, and we are developing similar solutions for the automotive, construction, packaging, and renewable energy sectors. We are reducing the corrosion, weight, and cost associated with metals by replacing them with nonmetallic alternatives, such as carbon fiber and composites.



Liquids-to-chemicals

Aramco is creating and deploying technologies to produce highly demanded chemicals with less emissions. This is significant given that the chemical sector is one of the largest industrial energy consumers. One example is the Shaheen petrochemical project in South Korea, which represented the first major commercial deployment of Aramco's thermal crude-to-chemicals technology, developed in collaboration with Lummus Technology. We continued to advance on our liquids-to-chemicals strategy in Asia, acquiring a 10% interest in Rongsheng Petrochemical in July of 2023.

Safe operations and people development

Workforce protection and process safety.....	54
Human rights	58
Labor practices.....	60



⊕ Captured within the dynamic environment of Aramco's operations, a female technical professional embodies the Company's steadfast commitment to safety.

Safe operations and people development



Our talented workforce is our greatest asset and we continue to invest heavily in developing people. We employ an array of both traditional and innovative platforms and programs to ensure our employees and contractors can realize their full potential safely and securely.

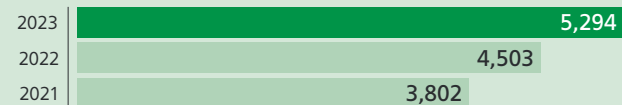
This approach is essential to our long-term success and is underpinned by our utilization of the latest digital and AI technologies. Our aim is to continuously improve the capabilities of our people, enhance the sustainability and reliability of our operations, and protect our workforce, assets, and communities.

In 2023, we delivered over 9 million hours of training¹, increased the apprentice intake by 27.3%, raised hired graduates by 14.1%, diversified our leadership with 26.3% growth in the percentage of females in leadership positions, and improved our safety performance by achieving a 16.0% reduction in total recordable case rate.

We remain steadfast in maintaining a strong culture of fostering a world-class pool of talent, developing future leaders and ensuring the safety of our operations. These are fundamental strategic priorities for us to achieve our long-term objectives.

2023 performance

Number of female employees



73,311

Aramco is home to 73,311 employees

Number of female employees in leadership positions



95²

Total hours of training and development (per employee)

94*

There are 94* different nationalities represented in Aramco's workforce

* Metric reported for the first time externally.

1. In line with the new methodology of calculating the training hours, the total number of training hours includes all training offered corporate-wide during the year for all employee categories in addition to trainees and contractors.

2. Total hours of training and development (per employee) metric consists of total training offered by the company during the year for all participants including Aramco employees, contractors and average levels of trainees.

Performance of our key metrics

Material issue	Relevant metrics	2023	2022	Status
Workforce protection ■ Read more on page 54	Number of fatalities	3**	5**	While we regrettably suffered three** losses of life, we conducted investigations and communicated lessons learned to the relevant stakeholders to minimize such incidents from recurring. For total recordable cases (TRC), incidents per 200,000 hours worked decreased (16.0% fall in TRC rate since 2022). This is a testament to our investment in training initiatives and implementation of a comprehensive Lessons Learned Program to mitigate incidents of a similar nature from recurring.
	Lost time injuries/illnesses rate (number of LTI cases x 200,000 / total work hours)	0.018**	0.014**	
	Total recordable case rate (total recordable incidents x 200,000 / total work hours)	0.042	0.050	
	Health performance (%) (number of overdue major health findings x 100 / total number of open major health findings)	19**	15**	
Process safety and asset integrity ■ Read more on page 56	Number of Tier 1 process safety events	15	11	None of the Tier 1 events were major, eight were moderate, and the remaining were classified as minor. Five out of the 15 incidents resulted in LTIs.
	Human rights ■ Read more on page 58	Number of grievances raised	230	293
Sites (%) with a grievance mechanism in place		100	100	We ensure each Aramco site has an appropriate grievance mechanism in place for our workforce to raise any concerns without prejudice.
Labor practices ■ Read more on page 60	Attrition rate (%) ¹	2.2	2.4	Aramco is fostering a culture of diversity and inclusion (D&I) within its organization. Aramco has made significant efforts to increase the representation of women and people with disabilities, including interns and sponsored students. These initiatives include hiring improvements, mentoring programs, policy enhancements, and developmental opportunities. In 2023, the percentage of female employees increased by 12.5% and the percentage of females in leadership positions increased by 26.3% compared to the previous year.
	Female (%) of total employees	7.2	6.4	
	Female employees in leadership positions (%)	4.8	3.8	
	Number of contractor employees	8,125	7,639	
	Number of hired graduates	1,665	1,459	
	Number of apprentices (new intake)	2,200	1,728	
Number of interns	3,201	3,190		

■ Full metrics table on page 102-103

Our contribution to the UN SDGs

3 Good Health and Well-being Aramco has various health and safety and well-being programs for our employees. These include mental health initiatives, workplace standards and technology to minimize exposure of our workers to unnecessary risk.

4 Quality Education Aramco believes in lifelong learning and development. We continue to provide world-class learning experiences that drive both personal growth and effective operations at all levels of the Company through innovative platforms such as corporate e-Learning, the Hosted University Program, Advance Development Programs and others.

5 Gender Equality Aramco is improving the gender balance of its workforce via a range of female empowerment initiatives. In Saudi Arabia, Aramco funds the STEM program for school-age girls, offering university scholarships for science, technology, engineering and mathematics degrees.

8 Decent Work and Economic Growth We have strong policies and processes to manage our ethics, bribery and corruption risks, and ensure a suitable working environment for our workforce.

** This figure has undergone/is undergoing external limited assurance in accordance to the ISAE 3000 (revised). Upon completion of assurance, the assurance report will be made available online on the Sustainability section of our website.

1. Scope expanded to include additional employee types.

Workforce protection and process safety

Workforce protection and process safety

Safety is integral and paramount to our operations at Aramco; it is ingrained in our values to safeguard our people, assets, and the environment.

In Aramco we operate under a "total workforce concept", where our ambitions are built on the foundation of a robust safety culture and safe environment across our employees, contractors, and suppliers. We strive to prevent all incidents that have the potential to harm people, damage assets, or negatively impact the environment.

Our focus on safety is complemented by our digital transformation initiatives which enable innovative safety solutions that drive safety performance, elevate emergency readiness, and enhance our safety governance.

For over 40 years, the Executive Management Safety Review program has been a steadfast initiative. Each month, corporate management alongside an executive management team, visit one of the Company's major operational areas to review their HSE performance and engage directly with employees and contractors to discuss safety matters.



Safety management system

Aramco's safety management system (SMS) provides a framework that integrates occupational and process safety, and assists business units in meeting safety expectations.

Our SMS was developed following comprehensive benchmarking with industry peers. It is aligned with requirements outlined in Occupational Health and Safety Management System ISO 45001:2018, and has been evaluated by an independent third party to ensure alignment with international best practices.

All Aramco organizations are assessed against SMS guidelines through our internal corporate safety assessment program. With over 50 SMS assessments performed in 2023, this program has been expanded to include in-Kingdom and international affiliates.



Sustainability in action

Aramco's fleet of vehicles transport our workforce safely to remote areas



Safety on the road

Our operations are widely spread, sometimes in remote places. Aramco used over 11,000 road vehicles covering more than 240 million kilometers, and over 500 buses, covering over 23 million kilometers to transport our people for business in 2023.

We continue to closely monitor and support the safety of our people on the road. In addition to mandatory traffic training and education, we use digital solutions aimed at improving traffic safety.

11,000+

Number of Aramco road vehicles



Safety at sea

We operate over 350 maritime vessels, with over 8,000 members of our workforce. Aramco's marine operations span the Kingdom's coastlines from the Arabian Gulf to the Red Sea, providing safe, reliable, and cost-effective integrated marine solutions.

This supports the Company's offshore operations such as exploration, drilling, production, exportation, crew transfer, oil spill response, subsea repairs, offshore logistics, and offshore security.

In 2023, 56 offshore marine employees participated in safety leadership courses, demonstrating a commitment to fostering a strong safety culture and effective leadership, while adhering to the latest international regulations and industry standards such as the International Maritime Organization (IMO) requirements.

350+

Number of Aramco maritime vessels



Safety in the air

Aramco operates one of the world's largest corporate aviation fleets, via its wholly-owned subsidiary Mukamalah. The fleet of 52 owned and leased, fixed wing and rotary aircrafts, annually transport nearly a million passengers. Our flights support Aramco's operations by providing transportation, geological surveying, special missions, search and rescue, and evacuation services. In 2023, Mukamalah reached a new record of over 51,000 flight hours due to growth and fleet size optimization.

The flight crew receive over 3,000 hours of in-house training annually. Additionally, over 200 pilots participate in semi-annual training sessions with certified providers to meet safety requirements according to industry best practices.

50+

Number of Aramco helicopters and airplanes

Workforce protection and process safety continued

Our safety performance

	2023	2022	2021
Fatal accident rate*	0.305**	Metric not disclosed previously	Metric not disclosed previously
Number of fatalities	3**	5**	1**
Total recordable case rate	0.042	0.050	0.054
Lost time injuries/illnesses (LTI) rate	0.018**	0.014**	0.017
Number of Tier 1 process safety events	15	11	11

* Metric disclosed for the first time.

** This figure has undergone/ is undergoing external limited assurance in accordance to the ISAE 3000 (revised). Upon completion of assurance, the assurance report will be made available [online](#) on the Sustainability section of our website.

Any loss of life is never acceptable and we aspire to achieve zero fatalities. Regrettably, Aramco had three** contractor fatalities during the year: one contractor fell from height while installing scaffolding; a second contractor was struck by a mooring rope while disconnecting a marine vessel from a single point mooring system; and a third contractor was struck by hoisting hardware on an offshore rig.

During this year, we introduced a new metric, which measures our fatal accident rate, representing the ratio between the number of recordable workforce fatalities per 100,000,000 and the total work hours. In 2023, our fatal accident rate was 0.305**.

Aramco has thoroughly evaluated these incidents to identify root causes and has initiated corrective actions, including employee awareness and increased supervision, to avoid such accidents in the future. Lessons from these incidents have been shared with all relevant departments and stakeholders, and remedial actions continue to be implemented. We continue to partner with our contractors to build a strong safety culture across our value chain and prevent such incidents from recurring.

With regards to our TRC rate performance, our improvement has continued over the past three years, with incidents per 200,000 hours worked having decreased (the TRC rate has decreased by 22.2% since 2021). This is testament to our investment in training initiatives and implementing a comprehensive lessons learned program to mitigate incidents occurring of a similar nature.

Aramco recorded 15 Tier 1 process safety events during the year. Out of these 15 events, 11 occurred at in-Kingdom wholly-owned operated assets and four at Aramco operationally controlled affiliates. None of the Tier 1 events were major, eight were moderate, and the remaining were classified as minor. Five out of the 15 incidents resulted in lost time injuries.



Sustainability in action

Cultivating a strong safety culture across our global operations

Aramco continues to reasonably support our subsidiaries in maintaining and improving a strong safety culture across our operations.

The established Global Safety policy governs our approach, supporting long-term success and resilience within the Aramco Group, promoting the welfare of our workers, the community, and the environment. Supporting the Global Safety Policy, the Company has developed and implemented an Affiliate Safety Oversight strategy to improve performance across the Aramco Group by focusing on governance, performance monitoring, assessment, engagement, and capability building.

In 2023, we hosted the second Global HSE forum, which attracted over 700 attendees from our subsidiaries around the world. This forum is among a number of initiatives that support our affiliates.

We continued our journey of conducting assessments of our affiliates across the globe, supporting the reinforcement of their safety management systems through the recommendations we provided.

We are building the capabilities of the affiliates by providing them with the necessary resources, training, and guidance to improve and continually enhance their safety performance.



We also introduced two additional health compliance programs: Radiation Protection Assessment and Hazardous Materials Communication Assessment into our health key performance indicators.

Contractor safety

Aramco aims to ensure the safety and welfare of its contractors. Our approach centers on strong field presence, performance assessment, and implementing effective governance measures.

We use bespoke tools to monitor contractor safety performance and compliance to corporate safety requirements. The Construction Safety Index (CSI) monitors contractor safety compliance with construction requirements and assesses the safety environment of our contractors. In 2023, 4,077 CSI inspections (2022: 3,300 CSI inspections) were conducted on 87 prime contractors.

Aramco utilizes the Turnaround Safety Index (TSI) that is focused on contractors' safety performance during turnaround and inspections. In 2023, 1,090 TSI inspections were completed (2022: 670).

Inspired by the continued success of CSI and TSI, the Rig Safety Index (RSI) was launched in Q4 2022 to monitor onshore and offshore drilling rig contractor safety performance. During 2023, 92 RSI inspections were completed, covering 17 prime drilling contractors.

We hosted the Project Management Contractor Safety Excellence Award that recognizes outstanding contractor performance in multiple categories, including wellness, technology deployment, and safety compliance.

Aramco launched the 'Line of Fire' campaign to address risks associated with danger zones at construction sites. The campaign targeted the contractor site workforce, elevating their safety awareness and capabilities to identify work site hazards and enhance their safe behavior.

Emergency preparedness

Aramco takes proactive measures to prevent emergency situations and maintain a robust emergency preparedness program. Aramco's Corporate Emergency Management Taskforce ensures resilience and readiness pre-planning, as well as risk based, and site-specific emergency response plans.

A quarterly forum for emergency preparedness coordinators from all Company stakeholders is held to continually improve emergency readiness. A major program improvement this year included an enhancement to the Company's digital safety system – SafeLife – that enables a corporate-wide tracking of emergency exercise schedules, as well as drill critique items until closure in a unified system.



Expanding safety training programs

Aramco worked closely with five National Training Centers (NTCs) to evaluate and enhance existing Safety Diploma Programs and to establish new ones. The NTCs were selected as they harbor the necessary infrastructure to deliver safety diploma programs efficiently, targeting high school graduates, to equip them with the required skills to be competent field safety officers.

Since inception of the new Safety Diploma Programs, the National Industrial Training Institute (NITI) graduated 135 participants, 97 males and 38 females, to be Field Safety Officers.

Additionally, in February 2023, Maharat Construction Training Center's Construction Safety Associate Diploma Program was inaugurated. The total number enrolled in the program during 2023 was 189 participants from different sponsoring companies.

Human rights

Human rights

Our people

For over 90 years, we have embraced diversity in our workforce. Today, the Aramco workforce is comprised of over 73,000 employees from more than 90 different countries. In Saudi Arabia, we are aiming to further promote female employment, multiculturalism and inclusion of people with disabilities (PwD). Our workforce is expanding by increasing female representation, adding employees from diverse backgrounds, and providing a workplace that caters to various needs.

73,311
employees

94*
nationalities

At Aramco, our people are offered a safe environment and opportunities to develop personally and professionally. We cherish the benefits that diversity creates in our community and business, and celebrate our history and legacy of people development.

Human rights in the workplace

Ensuring dignity and respect for all is paramount. We are dedicated to upholding human rights in the workplace, recognizing our role as a responsible corporate citizen. Our ambitions involve fostering a positive culture aligned with these values, with a strong stance against abusive or inhumane practices, modern slavery, exploitation, and child labor.

Number of grievances



Sites with a grievance mechanism in place (%)



We engage stakeholders to proactively prevent incidents that could compromise human rights. Striving to make enduring positive contributions, we focus on governance, transparency, rule of law, and social and economic development.

Our adherence to these values extends to compliance with local laws and respect for international human rights principles.

Code of Business Conduct

Aramco strives to ensure employees feel respected and safe. We rely on people in every part of our business to speak up on issues and act with integrity.

To maintain an ethical working environment, our people are encouraged to report any suspected non-compliance with the law, Aramco policies, or our Code of Business Conduct. Aramco provides several avenues for employees to ask questions and raise concerns, including escalation to management, calling an anonymous hotline and/or contacting Human Resources, Internal Audit or the Compliance departments.

Grievances

The Company has a formal grievance process that is overseen by our Human Resources department. This ensures all items raised are reviewed objectively and fairly resolved. At Aramco, we believe that every employee has the right to speak up without any fear of disciplinary action or any adverse impact on their career.

Employee engagement

To enhance the workplace experience for our people at Aramco, we interact with them through multiple communication avenues. These include town hall meetings, engagement surveys, recognition events, the intranet, periodic performance reviews, and the Young Leaders Advisory Board (a program consisting of employees 35 years of age and below) which serves as a bridge between the youth of Aramco and executive management.

The positive impact of our engagement efforts is demonstrated by our low attrition rates and a consistently high engagement score of 85% in 2022 and 2020. The survey is done on a bi-annual basis, the next survey will take place in 2024.

In October 2022, the corporate-wide bi-annual Employee Engagement Census Survey was launched across Aramco to over 75,000 employees and contractors. In response to the results of the survey (disclosed in our 2022 report), we undertook the following actions:

'How Starts with You' Campaign: Aramco launched a corporate campaign to highlight efforts being made in response to survey results. These results focused on four key areas: Recognize, Care, Enable, and Develop. To ensure widespread reach and compliance, over 28,000 toolkits were sent to all leaders and advocates in the Company.

Employee Experience Awards: As part of the 2023 President & CEO Excellence Awards, the top three performing departments in Employee Engagement were awarded Gold, Silver and Bronze awards by Aramco's President and CEO and the Senior Vice President of Human Resources.

Enhanced Well-Being Model: In response to employee needs, Aramco updated the Corporate Well-Being Program Model to focus on nine dimensions of well-being: physical, social, occupational, intellectual, financial, digital, environmental, emotional, and spiritual.

Employees acknowledging performance review meetings¹ (%)



* Metric reported for the first time externally.

1. In accordance with our ongoing review of our sustainability performance data, we have determined that the metric "Employees receiving regular performance reviews (%)" reported in 2022 and 2021 should be renamed "Employees acknowledging performance review meetings (%)" in order to more accurately reflect what this metric entails.

Labor practices

Diversity and inclusion

Aramco is fostering a culture of diversity and inclusion within our organization. We embrace our employees' differences and foster an inclusive workplace culture where every employee feels valued, respected, and heard. We strive to ensure all employees are provided equitable access to resources and opportunities. A key objective in our people strategy is to increase the number of women and people with disabilities in the Company and create a workplace where they, and all employees, can thrive.

Aramco continued to accelerate the development of female employees in 2023 through different options, including advanced-degree programs, undergraduate scholarships, and targeted offerings, while improving female representation in science, technology, engineering and mathematics (STEM) fields. The Company has also achieved major milestones in increasing the representation of women across the Company.

Today, our female employees include traders, pilots, fire safety inspectors, inventors, and scientists. We also continued to increase the number of female leaders through allocating additional seats in talent assessments and targeted leadership programs in Ivy League schools like Harvard and Wharton and global universities like LSE and INSEAD.

Aramco prioritizes maintaining a diverse workforce by strengthening its Employee Value Proposition through enhancing benefits, policies, and infrastructure to promote an inclusive work environment. For example, the Company now offers a reduced work schedule for people with disabilities to promote greater work-life balance.

	2023	2022	2021
Number of female employees	5,294	4,503	3,802
Female (%) of total employees	7.2	6.4	5.6**
Female (%) of total number of new hires	24.1	28.4	31.2
Number of female employees in leadership positions	233	176	136
Female employees in leadership positions (%)	4.8	3.8	3.1



** This figure has undergone external limited assurance in accordance with the ISAE 3000 (revised). The assurance report can be found [online](#) on the Sustainability section of our website.

Investing in our workforce

To ensure we attract talent from both within Saudi Arabia and globally, we held recruitment workshops across Africa, Asia, Europe, and North America. To prepare for the future of our workforce, Aramco has hired a steady stream of exceptional Saudi candidates into its professional development programs.

Aramco has also boosted its cooperation with local universities through a strong and growing internship program. By supporting the growth and development of young Saudis, Aramco is contributing not only to its strategic goals, but also to the Kingdom's vision.

Sustainability in action

Our National Training Centers bring Aramco's vocational training legacy to local communities

To support the growth of the Kingdom's economy, as well as to provide a robust pipeline of qualified local labor, Aramco began the National Training Centers (NTCs) initiative in 2008. The NTCs are the product of a strategic partnership between Aramco, select government entities, and the private sector to train young Saudis in critical and emerging industries.

To date, over 57,900 students have graduated from the NTCs in more than 80 different disciplines, with over 11% women. Given this record, the centers remain on track to meet their target of 100,000 graduates by 2030.

57,943

graduated to date

>80

training disciplines

+11%

female representation

Labor practices continued

Spotlight on training and development

Advancing career development opportunities for our people



At Aramco, we continue to excel at providing unique learning offerings to our workforce. Our Hosted University Program expands advanced-degree opportunities for our employees seeking master's degrees from top-tier universities while remaining on the job. The program brings the knowledge and expertise of leading global universities and institutions to the Kingdom to deliver customized, business-centered academic degrees.

The program is predominantly face-to-face sessions conducted in-Kingdom with a 7-week out of Kingdom duration at the university's main campus location. This leads to a more capable and adaptive workforce to assist in achieving the strategic goals of the Company.

By 2023, the Company has completed more than 35 hosted programs, successfully graduating more than 900 employees.

Notably, the Company signed agreements with top-tier business schools like Harvard, London Business School, and Wharton to focus on employee development and diversify opportunities, ensuring alignment between employees' aspirations and the Company's overall corporate strategy with over 2,000 participants to date. We have also introduced Harvard Manage Mentor Cafes to provide interactive sessions on soft skills, analytical competence, and leadership development; over 1,800 employees have benefited from this program.



Sustainability in action

First cohort of female pilots

Aramco has graduated its first cohort of female pilots in 2023, marking a significant milestone in the Company's aviation program. The program, which has been in development for over a decade and includes two years of university study, aims to ensure these pilots serve as role models and encourage more women to join the program. The graduates' backgrounds in engineering (civil and electrical) and computing has made them well-equipped to become the Company's pioneering female pilots.

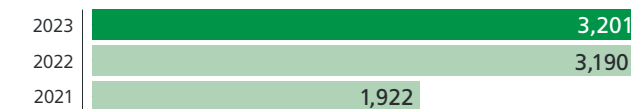
With one of the largest corporate fleets in the world, Aramco's aviation department offers these women, and those who will follow in their footsteps, an opportunity to follow their passion and achieve equal opportunity to venture into a field with low female participation. In this way, it offers not only a dynamic and well-paid career, but also a chance for them to realize their dreams.



Number of hired graduates



Number of interns



Number of apprentices (new intake)



2,500+

Aramco launched its "Supporting Well-Being for Leaders" course in 2022 to support the mental well-being of employees. Since its inception, it has been delivered to over 2,500 leaders in Aramco.

Workforce well-being

A healthy working environment is critical for employee health, positive engagement, and operational safety. To support our employees, dependents, and their families, medical services (including mental health) are provided across all Aramco sites and made easily accessible to our people.

In addition, Aramco supports the well-being of its contractor workforce through a dedicated Corporate Contractor Well-Being Program. Various free services are available to contractors in multiple languages including a 24/7 hotline, video counseling, online resources and awareness materials. Also, well-being and stress management engagement sessions have been conducted across the Kingdom. Furthermore, a Contractor Passport Solution that monitors key well-being parameters has been deployed Company-wide.

Minimizing environmental impact

Biodiversity and ecosystem services.....	68
Local environmental impact	72
Water management.....	74
Product stewardship and waste management.....	76



◆ The Arabian Sunbird is regionally native to Arabian Peninsula and present on Aramco BPAs in the western side of the Kingdom. The Arabian Sunbird geographical range spans from west of Arabia to Yemen further south. Sunbirds are not just beautiful – they are an important pollinator of native plants.

◀ **Photographer**
Philip Roberts

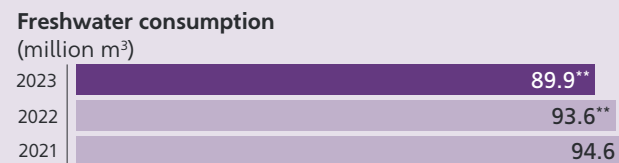
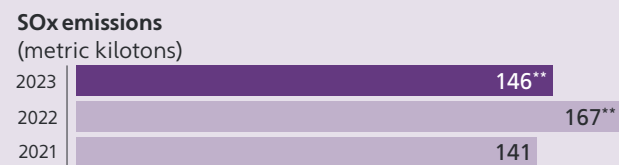
Minimizing environmental impact



Aramco has operated for more than 90 years in Saudi Arabia’s desert sands, and the overwhelming need to protect groundwater has fostered a culture of preservation in all the sectors in which we do business. From air, to water, to waste – we are applying circular economy principles to reduce impact, restore ecosystems and increase biodiversity.

This year we met and exceeded our 2025 target, two years in advance, to increase the biodiversity net positive impact by (NPI) 30% against our base year (2022). In 2023, we achieved an 85.6%^{**1} NPI because of the inclusion of additional Biodiversity Protection Areas (BPAs) in Saudi Arabia and significant expansion (over 700 km²) of our existing BPA in Shaybah.

2023 performance



85.6^{**1} %
Net positive impact

0.02 m³/boe*
Freshwater intensity

100 %^{**}
Number of sites with ISO 14001 certification

* Metric reported for the first time externally
 ** This figure has undergone external limited assurance in accordance to the ISAE 3000 (revised). The assurance report can be found [online](#) on the Sustainability section of our website.
 1. Ongoing management and review of the BPAs resulted in exclusion of the Manifa BPA from our NPI metric as a BPA, pending implementation of enhancements to align with the Company’s biodiversity governance.

Performance of our key metrics

Material issue	Relevant metrics	2023	2022	Status
Biodiversity and ecosystem services ■ Read more on page 68	Net positive impact (%)	85.6 ^{**1}	53.0 ^{**}	In 2023, we exceeded our 2025 target, two years in advance, to increase the NPI by 30% against our base year. In 2023, we achieved a 85.6% ^{**} NPI because of the inclusion of additional BPAs in Saudi Arabia and significant expansion of over 700 km ² of our existing BPA in Shaybah. As a result, the total area covered by BPAs is over 1,700 km ² .
	Local environmental impact ■ Read more on page 72	Number of hydrocarbon spills	12	15
Volume of hydrocarbon spills (barrels)	8,566 ^{**}	142,885 ^{**}		
Recovered hydrocarbon (%)	88 ^{**}	9 ^{**}		
Hydrocarbon discharge to water (barrels)	14.3 ^{**}	16.4 ^{**}		
Water management ■ Read more on page 74	SOx emissions (metric kilotons)	146 ^{**}	167 ^{**}	A series of measures, such as continuous improvement in sulfur recovery, operational efficiency, readily available Sulfur Recovery Units, and lower production, resulted in an overall decrease in sulfur oxides emissions from 2022.
	Number of sites with ISO 14001 certification (%)	100 ^{**}	98 ^{**}	In 2023, we achieved 100% ^{**} ISO 14001 certification at facilities under our operational control, i.e., the 52 upstream and downstream asset-based organizations enrolled in our Environmental Management System.
	Freshwater consumption (million m³)	89.9 ^{**}	93.6 ^{**}	In 2023, freshwater consumption was 89.9 ^{**} million m ³ , down 4.0% compared to 2022, due to effective water conservation efforts in Aramco’s upstream and petrochemical operations.
	Freshwater withdrawal (million m³)	135.7	136.6	
Freshwater intensity* (m³/boe) (total freshwater consumed relative to our hydrocarbon production)	0.02	Metric not disclosed previously		
Product stewardship and waste management ■ Read more on page 76	Industrial waste disposed (metric tons)	481,561	318,656	In 2023, Aramco generated 481,561 metric tons of industrial waste, which was disposed of in compliance with regulations and standards. While our efforts to minimize waste have improved, the observed increase in industrial waste from 2022 was attributed to the Company’s expanded operations and our efforts in improving industrial waste reporting system.
	Industrial waste recycled (%)	35.7 ^{**}	39.9 ^{**}	

■ Full metrics table on page 104

Our contribution to the UN SDGs



Given water scarcity in Saudi Arabia, Aramco has a large seawater treatment and injection network of facilities. Seawater is used as the primary source of water for oil production and to ensure clean water is available for our workforce and local communities.



Embracing circular economy principles and business models across our operations and activities. To date, we have trained and certified over 2,800 employees from different segments of our business in circular economy. This is supported by a circular economy guidebook and circularity maturity assessment to guide organizations across the Company in their circularity journey. Over 200 circular economy initiatives have been implemented, adopting circular business models aiming to optimize resources utilization and minimize environmental impact. For more information, please refer to Aramco’s circular economy section on our website.



Aramco has systems in place to manage all discharged water to the sea, meeting Government requirements by investing in maintenance and monitoring systems while proactively managing operations to avoid hydrocarbon leaks and spills by maintaining asset integrity throughout the life cycle.



Aramco aims to deliver biodiversity net gain in support of Vision 2030, SDG15 and the Saudi Green Initiative.



Partnering with organizations, such as Ipeca and WEF, to help promote good industry practice and better environmental performance. We are also working closely with our suppliers and creating incentives to reward them for improvements in their environmental performance.

* Metric reported for the first time externally
 ** This figure has undergone external limited assurance in accordance to the ISAE 3000 (revised). The assurance report can be found [online](#) on the Sustainability section of our website.
 1. Ongoing management and review of the BPAs resulted in exclusion of the Manifa BPA from our NPI metric as a BPA, pending implementation of enhancements to align with the Company’s biodiversity governance.

Minimizing environmental impact continued

Biodiversity and ecosystem services

Biodiversity

The planet continues to experience a decline in biodiversity due to human activity, and this is increasingly recognized as a significant risk to humanity. The UN Biodiversity Conference (COP 15, 2022) concluded with 196 countries, including Saudi Arabia, signing up to the Kunming-Montreal Global Biodiversity Framework (GBF). The GBF aims to address biodiversity loss, restore ecosystems, and protect indigenous rights, providing a refreshed roadmap for delivering the Global Goal for Nature to halt and reverse nature loss by 2030 and to become nature positive.

Net positive impact by 2030

This principle sits at the heart of Aramco's biodiversity policy and our use of the mitigation hierarchy. These provide the responsibilities and framework to safeguard biodiversity wherever the Company operates and to restore degraded areas, and in so doing, maintain and increase biodiversity and ecosystem services.

Aramco's activities overlap and potentially impact areas of high biodiversity value. To compensate for this, the Company has developed initiatives intended to ensure impactful contributions to biodiversity conservation, which are aimed at identifying opportunities and addressing associated risks.

Net positive impact

In alignment with the GBF, Aramco strives to achieve a net positive impact on biodiversity and ecosystem services by 2030. NPI occurs when biodiversity gains through our conservation projects outweigh negative impacts on biodiversity as a result of operations. We measure our NPI by comparing the surface area of our Biodiversity Protection Areas (BPAs) against that of our operational footprint.

An interim target was set in 2022, to achieve a 30% improvement in our NPI by 2025. However, in 2023, we achieved a 61.5% improvement in the year, taking our overall score to 85.6%**¹. This improvement in our performance was achieved due to changes in our BPAs in Saudi Arabia. The inclusion of three new BPAs and significant expansion (over 700 km²) of the existing BPA in Shaybah led to a large increase in the total land in our protected areas. The Shaybah Wildlife Sanctuary expansion was undertaken to match an increase in the number of native animals that are planned to be located in the sanctuary.



Our biodiversity mitigation hierarchy



** This figure has undergone external limited assurance in accordance to the ISAE 3000 (revised). The assurance report can be found [online](#) on the Sustainability section of our website.
1. Ongoing management and review of the BPAs resulted in exclusion of the Manifa BPA from our NPI metric as a BPA, pending implementation of enhancements to align with the Company's biodiversity governance.

Biodiversity and ecosystem services continued

Spotlight on Biodiversity at Aramco

Delivering net positive impact

At Aramco, we aim to achieve a net positive impact on biodiversity by 2030. In 2023, we achieved a 85.6%**² NPI, which is a 61.5% increase compared to the prior year, and exceeded, two years in advance, our 2025 NPI target.

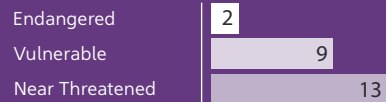
Central to achieving NPI is the Biodiversity Protection Area program. In 2023, we designated new terrestrial areas in Riyadh and Qassim, and Harqus Island in the Arabian Gulf as BPAs, bringing the total number of BPAs to 14 covering over 1,700 km². These new sites were assessed based on the International Union for Conservation of Nature (IUCN) criteria.¹ Additionally, the Shaybah Wildlife Sanctuary was expanded in 2023.

Our BPA network is supported by assessment of the contribution to conservation objectives and delivery of the Company's biodiversity aims to achieve NPI on biodiversity and ecosystem services.

As new sites are added, new species are being recorded. Aramco's BPAs provide a secure habitat for around 40% of all bird species in the Kingdom, including numerous migratory ones. Overall, our BPAs have recorded over 730 plant and animal species, including several globally Threatened and Near Threatened species under the IUCN Red List.



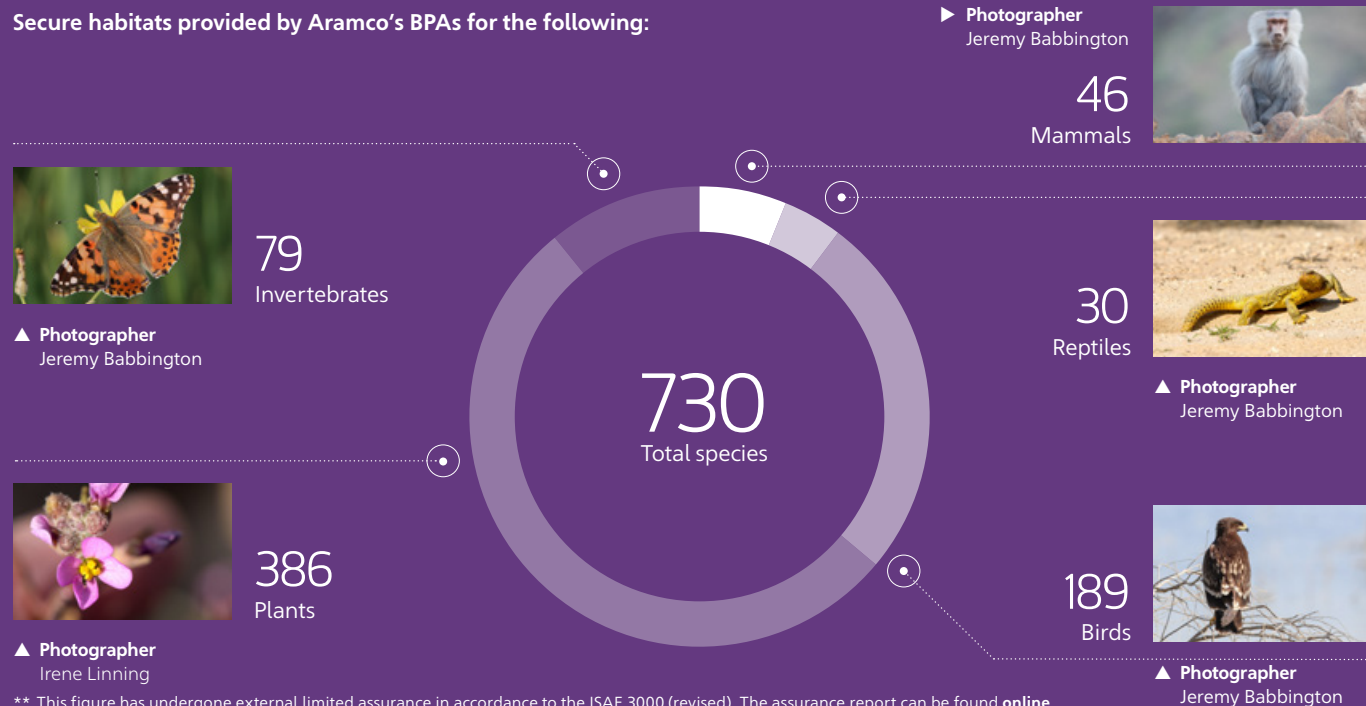
IUCN Red List



List of BPAs:

1. Shaybah Wildlife Sanctuary
2. Rahimah Bay Mangrove Eco-Park
3. Abu Ali Island
4. Tanajib Biodiversity Protection Area
5. Abqaiq Wetlands
6. Udhailiyah Biodiversity Protection Area
7. Abha Biodiversity Protection Area
8. Bahra Biodiversity Protection Area
9. Madina Biodiversity Protection Area
10. Khurais Biodiversity Protection Area
11. Baga Bird Oasis
12. Riyadh Biodiversity Protection Area
13. Qassim Biodiversity Protection Area
14. Harqus Island

Secure habitats provided by Aramco's BPAs for the following:



** This figure has undergone external limited assurance in accordance to the ISAE 3000 (revised). The assurance report can be found online on the Sustainability section of our website.
 1. Dudley N. 2008. Guidelines for Applying Protected Area Management Categories. International Union for Conservation of Nature.
 2. Ongoing management and review of the BPAs resulted in exclusion of the Manifa BPA from our NPI metric as a BPA, pending implementation of enhancements to align with the Company's biodiversity governance.

Nature-based solutions

To nurture, protect, and restore our environment, Aramco invests in nature-based solutions. Beyond the potential climate benefits of these solutions acting as carbon sinks, nature-based solutions, like mangroves, provide a home to many diverse wildlife species, a nursery for infant marine life, and a vital natural line of defense against natural disasters including shoreline erosion, and storms.

In 2023, we planted approximately 6.5 million mangroves and 1.1 million native trees in the Kingdom. This brought the total number of planted native trees to 4.1 million. To date, our cumulative total of planted mangroves is over 30 million, while the carbon stock of the planted and existing mangroves was validated to be equal to almost 445,000 tons of CO₂e.

Coral reefs

Coral reefs are one of the most diverse ecosystems in the world and we have been proactively promoting the growth of marine life with artificial reefs. Along with our offshore oil and gas facilities acting as artificial reefs by providing substrate for marine communities; Aramco continues to work with the Okinawa Coral Reef Conservation Consortium in Japan. This initiative ensures the future of endangered coral reefs around Okinawa.

Building on 11 years of research, we have conducted studies on how to restore the coral reefs, and have run educational programs reaching out to school children to nurture understanding, as well as appreciation for the natural environment. We are currently scaling up our efforts to focus more directly on coral revitalization by cultivation and planting.

Seaweed

The Yanbu seaweed pilot project to harness the potential of seaweed cultivation was completed in 2023. We have cultivated different genes of seaweed such as Sargassum and Kappaphycus, which are native to the Red Sea in the Western Region. Furthermore, an algae market survey has been completed, to further support potential future seaweed projects. These surveys provide comprehensive data that enable the assessment of investment viability and market potential for evaluating investment opportunities in the algae industry.

Wetlands initiatives

Aramco is cognizant of the ecological significance of wetlands (including their role in carbon sequestration), with many located on its land. Aramco's wetlands strategy focuses on the restoration and protection of natural wetlands on our land, and the creation of constructed wetlands, a cost-effective, energy efficient, and more environmentally benign alternative to traditional wastewater treatment methods.

The top priority natural wetlands will be explored for designation as BPAs, adding to the almost 1,700 km² already protected by Aramco across Saudi Arabia.

Sustainability in action

Supporting the aquaculture sector under Saudi Vision 2030

The construction of Abu Ali Fish Hatchery project was completed in 2023. The hatchery aims to support the biodiversity of the marine ecosystem and safeguard the value of commercial fish stocks for the local fishing community. The project is part of the Company's biodiversity offsetting ambitions and is important to the realization of the Kingdom's aquaculture sector under Vision 2030. This facility also includes planting of 200,000 mangroves to create an important nursery habitat for juvenile fish released to the Arabian Gulf.

Local environmental impact

Air emissions

Since 2012, our operations have been supported by Aramco's Environmental Management System (EMS), which provides a systematic and planned approach to achieve compliance with local environmental regulations and support for adoption of international good practices. In 2023, we achieved 100%** ISO 14001 certification at facilities under our operational control that is the 52 upstream and downstream asset-based organizations enrolled in our EMS, of which 50 organizations are in Saudi Arabia, and two organizations are located outside of the Kingdom.

SOx, nitrogen oxides (NOx), and volatile organic compounds (VOCs)

Aramco monitors its air emissions and, where necessary, establishes measures to reduce their impact on our workforce, local communities, and the environment.

In 2023, we continued our program of upgrading Sulfur Recovery Units (SRUs) with tail gas treatment units. Tail gas treatment is gaining importance as the preferred technology to reduce sulfur oxides emissions, support our efforts in fulfilling our compliance obligations and as we explore economic opportunities for sulfur. This program will continue in 2024.

The combination of continued improvements in sulfur recovery, operational efficiency alongside readily available SRUs, and lower production, resulted in an overall decrease in sulfur oxides emissions from 2022.

Emissions of NOx from our operations are mainly attributed to the combustion of hydrocarbon fuels for generation of electric power and heating required in our facilities. Reductions of NOx emissions are achieved via energy optimization measures, alternative fuels or, most significantly, when hydrocarbon-fueled power generation is replaced with renewable electric power. NOx emissions from our facilities are governed by the emission limits mandated by our corporate environmental standards and the national environmental regulatory standards.

To ensure we continue to meet Saudi Arabia's regulations, many of our facilities have been upgraded with low and ultra-low NOx burners to reduce NOx emissions.

We continue to invest in VOCs control systems and equipping our bulk loading facilities with Vapor Recovery System to minimize associated VOCs emissions.

** This figure has undergone external limited assurance in accordance to the ISAE 3000 (revised). The assurance report can be found [online](#) on the Sustainability section of our website.

43

environment and health site assessments conducted during 2023

We conducted more than 43 environment and health site assessments during 2023 to manage and mitigate any negative environmental and health risks of our operations around the world.

SOx emissions (metric kilotons)



Award

Abqaiq Plants achieves 1st place in the 2023 King Khalid Foundation Sustainability Award

Abqaiq Plants achieved Gold status in the 2023 King Khalid Foundation Sustainability Award for its commitment to sustainability in governance, social responsibility, economic practices, and environmental stewardship. Abqaiq Plants also adopted advanced technology, including Unmanned Aerial Vehicle (UAV) drone programs for improved environmental monitoring.



Spills to the environment

To meet our aspirational target of zero spills, Aramco employs rigorous inspection programs to assess the integrity of assets, putting fail-safe measures in place, training employees to ensure they are familiar with good practices and procedures.

Some of our key oil spill detection procedures include:

- Utilization of technologies to predict possible failures for rapid decision making and action;
- Regular oil spill drill procedures for hydrocarbon handling facilities;
- An oil spill trajectory prediction system to provide efficient response to oil spill emergencies in the marine environment. The prediction system offers user-friendly interfaces for forecasting oil spills through real-time online queries with their outputs streamed to a dashboard for visualization and analysis;

- Technologies that monitor and enable rapid response to oil spills;
- Local and international knowledge sharing; and
- Collaboration to share lessons learned from incidents and share good practice.

In the event of any spills, we have response plans that enable rapid mitigation. Our management processes focus on mitigating the impacts of hazardous chemicals and air, water, and soil contamination.

In 2023, the number and volume of hydrocarbon spills fell significantly (a 20.0% fall in number of hydrocarbon spills, and a 94.0% decline in volume of hydrocarbon spills compared to 2022).

While we aspire for zero oil spills, we did regrettably have 12 oil spills, which led to a volume of 8,566** barrels being spilled. Following our significant recovery efforts, we were able to recover 88%** of hydrocarbons.

Of these 12 oil spills, nine were onshore with a cumulative volume of 8,551 barrels and three offshore spills in the Arabian Gulf.

All spills were rapidly halted by the response team and the impacted sites were rehabilitated to eliminate further environmental impacts. One onshore oil spill with a volume of 8,335 barrels that was due to a damaged pipe in the East-West pipeline was responsible for more than 97% of the total oil spills. The affected area was remediated.

	2023	2022	2021
Number of hydrocarbon spills	12	15	13
Volume of hydrocarbon spills (barrels)	8,566**	142,885**	14,447
Recovered hydrocarbon (%)	88**	9** ¹	94

** This figure has undergone external limited assurance in accordance to the ISAE 3000 (revised). The assurance report can be found [online](#) on the Sustainability section of our website.

1. In 2022, the largest spill was due to an incident concerning a major loss of containment of crude that caught fire. Due to the combustion of the crude, the majority of it was not recoverable, leading to a low hydrocarbon recovery rate for 2022.

Water management

Water management

Our approach to water

With the country's arid environment, and Saudi Arabia ranked as the eighth most water stressed country in the world¹, Aramco has long recognized the value of water. Since recording measurements began in 1978, Aramco has been able to conserve more than 160 billion gallons of groundwater. More than 1,600 groundwater monitoring wells in 63 facilities assess groundwater quality.

As disclosed in our 2022 Sustainability Report, Aramco is pursuing a water neutrality aspiration to conserve water natural resources and reduce dependency on non-renewable water supply (groundwater). To achieve this goal, across our businesses in Saudi Arabia and abroad, we are reducing our extraction of groundwater by using non-traditional water sources such as seawater, treated sewage effluent, and treated reject streams.

We measure water conservation performance through:

- Reviewing water conservation data and key performance metrics;
- Conducting water optimization studies on capital projects;
- Assessing Company operating facilities for compliance; and
- Following good industry standards and water conservation technologies.

In 2023, freshwater withdrawal fell by 0.7% compared to the prior year. This reduction was due to effective water conservation efforts in our operations. While our freshwater withdrawal fell, our freshwater consumption was 89.9** million m³ in 2023, which is a 4.0% reduction compared to prior year.



Award

North Ghawar Producing Department wins the 2023 Manufacturing Leadership Award for its Hybrid Produced Water Treatment Technology

North Ghawar Producing Department has won the international Manufacturing Leadership Award under the engineering and production category. The National Association of Manufacturers' Manufacturing Leadership Council recognizes world-class manufacturing companies and individual leaders for their outstanding efforts and projects.

During the year, we introduced a new metric to measure freshwater intensity (m³/boe). The metric measures the total freshwater consumed relative to our hydrocarbon production. In 2023, our freshwater intensity was 0.02 m³/boe. There are no prior year comparatives.

	2023	2022	2021
Freshwater consumption (million m ³)	89.9**	93.6**	94.6
Freshwater withdrawal (million m ³)	135.7	136.6	137.3
Freshwater intensity* (m ³ / boe)	0.02	Metric not disclosed previously	

Wastewater and discharges to water

By virtue of its large operations, Aramco produces significant volumes of wastewater. A comprehensive wastewater effluents management program is implemented to protect the environment and public health.

This is achieved through the following measures:

- Developing and updating the Company's wastewater compliance and engineering standards;
- Optimizing the design of wastewater facilities to adequately treat wastewater; and
- Maintaining a vigilant wastewater discharge monitoring program.

Our approach to wastewater and discharges to water are informed by relevant national and international frameworks or standards, including the Executive Regulations for the Protection of Aqueous Media from Pollution, among other Saudi Arabia Government Environmental Standards; and Ipieca's Oil and Gas Industry Guidance on Voluntary Sustainability Reporting – Discharges to Water.

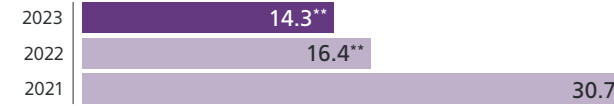
* Metric reported for the first time externally.
 ** This figure has undergone external limited assurance in accordance to the ISAE 3000 (revised). The assurance report can be found [online](#) on the Sustainability section of our website.
 1. World Resources Institute.

Assisted by our corporate digitalization vision, we monitor hydrocarbon discharge to water through the hydrocarbon discharge to water (HC2W) dashboard. Performance, since 2021, shows an overall positive trend with a sustained reduction in the

volume of hydrocarbon discharged. This is due to various actions being taken, including:

- Proactive procedures to avoid any incidental discharge;
- Preventive upkeep of aging equipment; and
- Enhanced tracking and monitoring through the HC2W Corporate dashboard.

Hydrocarbon discharge to water (barrels)



Sustainability in action

Aramco's progress towards its water neutrality aspiration

Below are some selected case studies of the various water management initiatives taking place across Aramco in pursuit of our water neutrality aspirations.

Embracing digitization to conserve groundwater

Aramco piloted digital technology to enhance the recovery of the reverse osmosis process at one of our facilities in 2023. Captured data revealed that more than 10% groundwater (i.e. 0.6 million m³ per year) could be conserved by real-time monitoring through alerts and forecasts generated by the tool.

Optimizing water usage with enhanced data systems

Our Drilling & Workover team delivered an enhanced water data gathering and analysis system. All onshore and offshore departments can now monitor and report their water data for drilling, workover and water well rigs in a common electronic platform. This data is used to optimize water usage.

Utilization of ultrasonic technology to conserve groundwater

In our South Ghawar production facility – part of the largest conventional oil field in the world – Aramco demonstrated the application of ultrasonic cleaners as an alternative to conventional high-pressure jetting cleaning of valves and piping. This demonstrated that efficient utilization of an ultrasonic cleaner can potentially result in substantial groundwater saving.

Groundwater conservation in Abqaiq

We are replacing the use of aquifer water with seawater injection for reservoir pressure maintenance. Upon completion in 2024, the project is expected to supply 76% of the injection volumes from seawater. This share is expected to increase to 100% by 2029.

Achieving water neutrality at Jazan

At the Jazan Refinery Complex, industrial and sanitary wastewater are treated in a centralized wastewater treatment plant equipped with technologies for total reuse, to achieve substantial reduction in groundwater use. The facility manages both the Jazan Refinery pre-treated industrial effluent and sanitary wastewater from the refinery, marine terminal, and our integrated gasification combined cycle power plants.



** This figure has undergone external limited assurance in accordance to the ISAE 3000 (revised). The assurance report can be found [online](#) on the Sustainability section of our website.

Product stewardship and waste management

Product stewardship and waste management

Industrial waste management

In 2023, we made progress in meeting key milestones in our corporate waste management strategy to minimize and divert landfilled waste. Aramco's operating facilities have been conducting waste minimization assessments to identify opportunities to reduce industrial waste generation and enhance the implementation of environmentally sustainable practices across our operations.

We have continued to implement automatic crude oil tank cleaning technologies to recover hydrocarbons from oily sludge tank bottoms, a practice that is contributing to enhanced industrial waste management system and operational efficiency. We are also collaborating with potential off-takers for spent catalysts for reuse and recovery purposes.

The Company is developing novel circular technology solutions in partnership with its subsidiary SABIC and applying them at scale to reduce single-use plastic waste and meet recycling regulations. These solutions include integrating mixed plastic waste into refineries to produce circular products and creating large-scale plastic sinks such as plastic waste in asphalt.

In 2023, the Company generated 481,561 metric tons of industrial waste, which was disposed of in compliance with regulations and standards. While our efforts to minimize waste have improved, the increase in industrial waste from 2022 was attributed to the Company's expanded operations and our efforts in improving the industrial waste reporting system.

As part of our industrial waste management contractor monitoring program, we have conducted technical site visit assessments to our industrial waste management third-party service providers to ensure that our waste is being managed in line with our industrial waste management standards and as per governmental regulations. The Company has completed the revalidation of existing industrial waste management service providers currently available in the Company's Qualified Supplier List, which included 22 third-party industrial waste management and transport service providers for sustainable management of our generated industrial waste.

	2023	2022	2021
Industrial waste recycled (%)	35.7**	39.9**	39.8
Industrial waste disposed ^{1,2} (metric tons)	481,561	318,656	240,255
Industrial waste disposed – Upstream (metric tons)	253,044	Breakdown not disclosed previously	
Industrial waste disposed – Downstream (metric tons)	174,790	Breakdown not disclosed previously	

** This figure has undergone external limited assurance in accordance to the ISAE 3000 (revised). The assurance report can be found [online](#) on the Sustainability section of our website.

1. The name of this metric was changed from industrial waste generated to industrial waste disposed in 2023. The definition of the metric remained the same.
 2. Industrial waste disposed number includes operationally controlled affiliates and other waste streams not generated by upstream and downstream operations.



Sustainability in action

Bringing sustainability to our offshore and marine activities

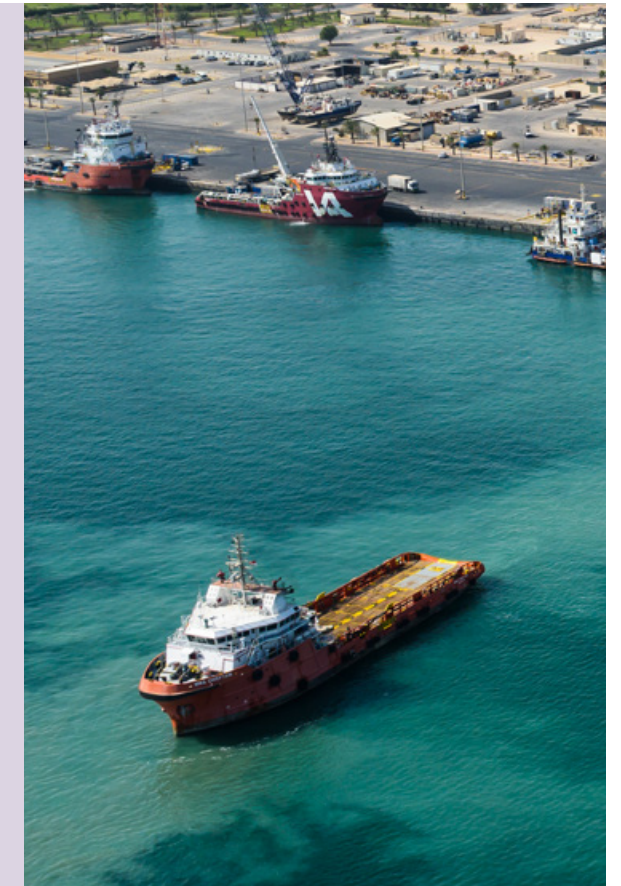
Aramco is focusing on implementing circular economy principles across our operations to lower emissions and provide innovative solutions for a more sustainable future. We have identified a new area for environmental improvement, including offshore waste management, as part of our drive for continuous improvement and operational excellence.

The Marine Waste Recycling Program (MWRP) aims to use offshore waste, as raw materials for future products, and is being implemented at Tanajib Marine Facility, one of the world's largest offshore oil operations, which houses 500 assets in 10 oil and gas fields.

In 2023, the MWRP resulted in more than 1,200 tons of waste materials being successfully sorted and recycled from Aramco Tanajib Marine Facility through nearly 700 collection trips.

Aramco has also improved marine safety and performance by implementing SmartShip technology, which utilizes over 1,000 sensors and artificial intelligence to monitor and remotely access marine vessels, resulting in an 8% reduction in fuel consumption and carbon emissions per ship annually.

We have also introduced Hybrid Vessels technology, which combines traditional propulsion systems with electric battery systems, similar to a hybrid vehicle but on a much grander scale. The technology has helped to reduce GHG emissions, fuel consumption, and maintenance costs since implementation.



Sustainability in action

Repurposing waste into sustainable concrete

In 2023, we conducted a pilot scheme whereby abrasive materials waste (such as copper slag) was reused to create a more sustainable concrete to minimize waste generation. This concrete provides a higher compressive strength than conventional concrete. It can prevent thousands of tons of blasting materials waste from being sent to landfills, by reusing them in Aramco projects for non-structure applications such as walkways, wheel stops, or concrete traffic barriers.

Corporate circular economy roll-out

We continue to roll-out the circular economy program across the Company value chain from design and engineering followed by procurement, construction, operation, services, to digitalization and information technology. To date, we have trained and certified over 2,800 employees from different segments of our business in circular economy. This is supported by a circular economy guidebook and circularity maturity assessment to guide organizations across the Company in their circularity journey. Over 200 circular economy initiatives have been implemented, adopting circular business models aiming to optimize resources utilization and minimize environmental impact.

Drilling and Workover (D&WO) circularity program

During 2023, D&WO implemented adopting circular business models aiming to optimize resources utilization and minimize environmental impact. Circular economy initiatives focused on materials, chemicals consumption, assets utilization, water conservation, and waste minimization in drilling and workover operations.

In 2023, we recycled and reused over 3.9 million barrels of drilling fluids, refurbished over 2,000 wellheads and pieces of well control equipment, reutilized more than 6,000 repaired drilling assets, and refurbished over 8,500 metric tons of oil country tubular goods. We implemented closed loop drilling practices in 257 well sites, which allowed us to reduce water consumption at these wells by 13 million barrels and to reduce wastewater by 3 million barrels.

Procurement and Supply Chain Management (P&SCM) circularity program

We continue to implement circular economy principles in our procurement and supply chain by adopting circular business models, such as circular procurement and reverse logistics, sharing, and asset's life extension. The P&SCM circularity program consists of circular initiatives that align with our circular economy principles, strategies, and corporate policies. The program includes reverse engineering spare parts, shelf-life extension, refurbishment programs, and scrap recycling.

During 2023, P&SCM circularity programs recycled more than 85,000 tons of materials such as ferrous scrap, plastic drums, and aluminum.

Growing societal value

Labor practices and national content.....	82
Human rights in the supply chain	87
Community and society.....	88
Economic contribution	93



The King Abdulaziz Center for World Culture
Aramco's flagship social initiative, the King Abdulaziz Center for World Culture (Ithra- meaning "enrichment" in Arabic), aims to make a tangible and positive impact on human development by inspiring passion for knowledge, creativity and cross-cultural engagement while delivering world-class experiences.

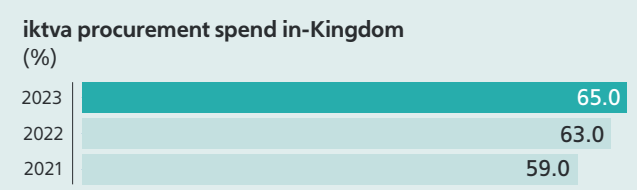
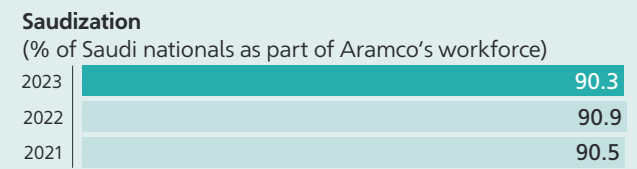
Growing societal value



As we expand our business globally, we seek to grow societal value wherever we operate. We do this by sharing our extensive experience in supporting the Kingdom's aspirations with our host communities around the world. Saudi Arabia is undergoing an unprecedented social, economic, and cultural transformation under Vision 2030, and Aramco is playing an integral role in implementing the Kingdom's landmark program.

Since opening in 2018, our Ithra hub has become an epicenter for culture, community, art, and knowledge, while we are also driving economic growth and diversification through our twin iktva and National Champions programs. From the inception of our iktva program to the end of 2023, our cumulative iktva GDP contribution has totaled \$202.9 billion dollars.

2023 performance



\$475 million
Social investments²

\$202.9 billion
Cumulative iktva GDP contribution*

* Metric reported for the first time externally.
 1. Increased data management identified that in the 2022 Sustainability Report, Aramco's volunteering hours consisted of not only employees' volunteering hours but also members of our communities. Therefore, from 2023 onwards, Aramco will now separately report the 'number of volunteers' and 'number of volunteering hours' for both employees and members of community volunteering with Aramco.
 2. Updated methodology: this is the first year we are reporting on the costs of running Aramco-built schools, as part of our social investment. We have also revised the prior year figure to reflect this change. With this updated methodology, the 2022 figure is now \$453 million compared to \$370 million under the previous methodology.

Performance of our key metrics

Material issue	Relevant metrics	2023	2022	Status
Labor practices ■ Read more on page 82	Number of people on Aramco sponsored community programs¹	15,099	12,160	The number of people in our sponsored community programs increased by over 24.2% compared to 2022, demonstrating our firm strategy to building capacity and capabilities of local people in Saudi Arabia.
	National content ■ Read more on page 82			
	Saudization (% of Saudi nationals as part of Aramco's workforce)	90.3	90.9	Aramco continues to contribute to the Kingdom's Saudization program, whereby 90.3% of our employees are Saudi nationals. Compared to the prior year, there was a year-on-year increase in the Saudization of our third-party contracts, with the Saudization of construction contracts reaching 29.7% (versus 28.0% in 2022).
	Saudization of construction contracts (%)	29.7	28.0	
	Saudization of service contracts (%)	56.2	57.2	
	Cumulative iktva GDP contribution* (\$ billion)	202.9	166.0	Aramco's total domestic spending is estimated to have contributed \$202.9 billion in GDP since iktva's inception, when considering the direct and indirect supply chain contribution to the Kingdom's economy. This result was driven by an increase in in-Kingdom spending, growth in local investments and increased supplier contributions across all iktva components.
Community and society ■ Read more on page 88	Social investment² (\$ million)	475	453	In 2023, we made social investments of \$475 million in Saudi Arabia and abroad ² . More details on some of these projects is provided on page 90.
	Total number of volunteers³	7,037	4,941	Aramco fosters a volunteering and giving mindset among both employees and community members, across a range of programs and initiatives. As a result, the total number of volunteers and total number of volunteer hours increased compared to 2022.
	Total number of volunteering hours³	171,633	168,590	
Economic contribution ■ Read more on page 93	Direct economic value generated and distributed (\$ million)	Breakdown of our economic value generated and distributed is on page 106.		Aramco continued to create economic value wherever it operates as it recorded revenues of \$441 billion, made \$205 billion in payments to governments ⁴ , and increased dividends ⁵ payments by 29.1% (\$102 billion in 2023 versus \$79 billion in 2022).

■ Full metric table on page 105

Our contribution to the UN SDGs

- 3 Good Health and Well-being**: Aramco has various social investment programs, which look to improve the health and well-being of our host communities around the world.
- 4 Quality Education**: Aramco promotes lifelong learning and development by building schools and establishing market-driven training centers for a skilled Saudi workforce. The Company also supports education centers for individuals with disabilities, such as the Hiba Center for Down Syndrome and the Abdullatif AlFozan Autism Center.
- 8 Decent Work and Economic Growth**: Supporting the economic development of our employees and communities in-Kingdom via our iktva spend, various home ownership and Aramco initiatives to seed micro industries (e.g., Roseyar, beekeeping in al-Baha, fisheries in Yanbu and Baish, olive products in al-Jouf, coffee cultivation in Jazan).
- 9 Sustainable Industry**: Aramco prioritizes a top-tier local supply chain for more sustainable energy solutions.
- Diverse Infrastructure**: Aramco's Kingdom-wide infrastructure contributions span natural gas, roads, educational facilities, and cultural centers.
- 17 Partnerships for Sustainable Development**: Partnering with governments, suppliers, non-profit organizations, and education institutions. During 2023, \$475 million² was invested in various social initiatives, supporting more than 30 non-profit organizations around the world.

* Metric reported for the first time externally.
 1. These programs include the Vocational College Internship Program (VCIP), University Internship Program (UIP), Summer enrichment program, Tomooh program, Advantage program, and Arizona Centers for Comprehensive Education and Life Skills (ACCEL) International Ajyal Center.
 2. Updated methodology: this is the first year we are reporting on the costs of running Aramco-built schools as part of our social investment. We have also revised the prior year's figure to reflect this change. With this updated methodology, the 2022 figure is now \$453 million compared to \$370 million under the previous methodology.
 3. Increased data management identified that in the 2022 Sustainability Report, Aramco's volunteering hours consisted of not only employees' volunteering hours but also members of our communities. Therefore, from 2023 onwards, Aramco will now separately report the 'number of volunteers' and 'number of volunteering hours' for both employees and members of community volunteering with Aramco. Metric reported externally for the first time externally.
 4. Figure includes income taxes, royalties and dividends to the Saudi government.
 5. Dividends paid includes dividends to shareholders and non-controlling interests in subsidiaries.

Labor practices and national content

Labor practices and national content

Building the local workforce and supply chain in the Kingdom of Saudi Arabia

With our headquarters in Saudi Arabia, we have a proud, decades-spanning history of educating and training Saudi nationals, as well as our international workforce. From investing in schools to supporting national technical training centers across Saudi Arabia to sponsoring tens of thousands of employees and students in undergraduate and post-graduate education, we believe we run one of the largest corporate-led training and education programs in the world. This has delivered the enormous benefit of a highly skilled workforce of Saudi men and women to our Company and to the Kingdom.

24.2%

The number of people on our sponsored community programs¹ increased by over 24.2%, compared to 2022, demonstrating our aim to build capacity and capabilities of local people in Saudi Arabia

Saudization

Aramco aims to build local capacities and invest in local citizens. Aramco continues to contribute to the Kingdom's Saudization program, whereby 90.3% of our employees are Saudi nationals. Compared to the prior year, there was a year-on-year increase in the Saudization of our third-party contracts, with the Saudization of construction contracts reaching 29.7% (versus 28.0% in 2022).

Localizing the supply chain where we operate

From Aramco's inception more than 90 years ago, we have played a central role in supporting the development of local businesses in Saudi Arabia with localization of our supply chain being the underpinning strategic theme. From assisting SMEs during startups, to helping companies expand regionally, Aramco has developed a Saudi-based energy ecosystem. Today, our multi-billion dollar in-Kingdom Total Value Add (iktva) program sits at the center of these efforts, helping domestic energy-related industries to flourish and become globally competitive.

Through a series of integrated localization programs, we are expanding our in-Kingdom support beyond energy, assisting the Kingdom's Vision 2030 by investing in, and nurturing, SMEs and larger enterprises across multiple domains, particularly in new technology and digital innovation, sustainability, and manufacturing.



Sustainability in action

Broadening educational opportunities for our youth

In 2023, we achieved several milestones in educating our youth and supporting our communities through Aramco sponsored community programs. From 2021 to 2023, the number of participants in these programs grew by 68%.

Through the University Internship Program, we worked with our supply chain to increase the number of internship students, with 61% placements in JVs, vendors and National Training Centers (NTCs), and achieving 45% female participation. The program works with over 3,000 students.

The Tomooh program aims to enhance skills of high-performing secondary school students, preparing them for university placement. In 2023, nearly 1,000 students improved their scores on SAT (Scholastic Aptitude Test) subjects, IELTS (International English Language Testing System), and 21st-century soft skills, along with an introduction to the Company's core business.

The Advantage Academy is a community initiative aimed at empowering over 600 underprivileged youth by offering training in relevant programs such as English, math, science, pre-college test preparation, and life skills. It also provides advisory and counseling services, as well as edutainment such as site visits and sports.

In 2023, we increased training and recruitment efforts for people with disabilities (PwD), achieving the highest level of students in our apprenticeship programs. We boosted our intake six-fold and implemented new policies, partnering with the Arizona Centers for Comprehensive Education and Life Skills (ACCEL) schools to provide individual support and development plans. The center is located in Ajyal community, Dhahran, and has a capacity of 320 students.

Our iktva program

Our iktva (in-Kingdom Total Value Add) program has been a critical enabler of the Saudi domestic energy industry ecosystem and we are on track to meet our iktva target of having 70% of all our procurement spend remain in-Kingdom by the end of 2025. In the seventh edition of the iktva Forum, which showcases all our partners under one roof, we reached more than 85,000 visitors. The Forum showcased more than 200 investment opportunities with an annual market share of \$16 billion, and included the signing of more than 100 localization memoranda-of-understanding (MoUs). Through iktva, the local content of our overall 2023 procurement spend across our supply chain stood at 65.0% (2022: 63.0%).

\$202.9 billion
GDP contribution since iktva's inception

By bringing our supply chain closer to our operations, we are embedding resilience and ensuring we remain one of the most reliable suppliers of energy to the world. This is being achieved through attracting

investment and cultivating partnerships with top global energy, logistics, and manufacturing companies, to localize suppliers' manufacturing capabilities and eliminate supply chain risks.

The iktva program is opening up investment opportunities that can help drive the creation of products and innovations that are not only in demand, but can also play a role in lowering the carbon emissions of the industry. Iktva is also a platform through which we implement the adoption of industry standards and best practices in both operations and labor practices via our supplier assessments.

In 2023, 32 new local manufacturers were established, allowing the introduction of items manufactured for the first time in the Kingdom, including: subsurface safety valves, safety footwear, coalescing filters, and specialty coatings for drilling equipment. During the year, Aramco entered into 86 in-Kingdom corporate purchase agreements with an estimated value of \$3.3 billion to build long-term collaborative relationships with strategic local suppliers.

Aramco's procurement of domestically produced goods and services has benefited the Kingdom's economy. Aramco's total domestic spending is estimated to have contributed \$202.9 billion in GDP since iktva's inception, when considering the direct and indirect supply chain contribution to the Kingdom's economy. This result was driven by an increase in in-Kingdom spending, growth in local investments, and increased supplier contributions across all iktva components.

Cumulative iktva GDP contribution* (\$ billion)



iktva procurement spend in-Kingdom (%)



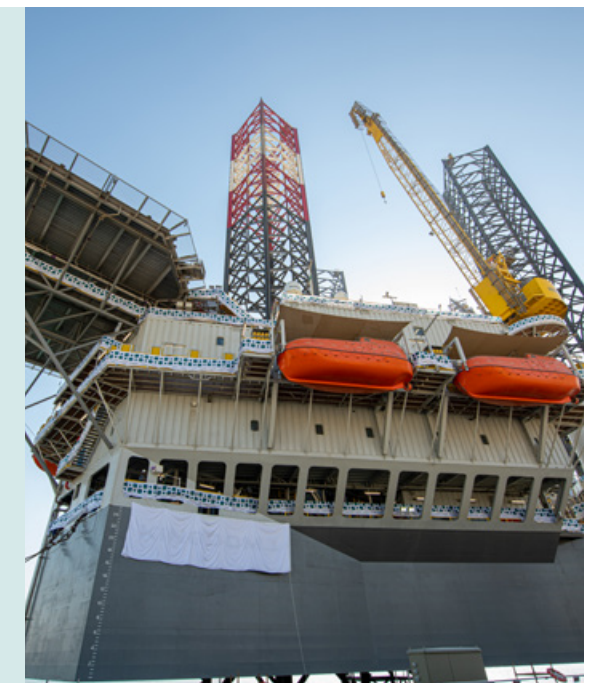
Sustainability in action

Building the first locally manufactured offshore rig

International Maritime Industries (IMI), the largest shipyard in the MENA region, built the first Aramco Rowan Offshore Drilling (ARO Drilling) offshore rig based in Saudi Arabia.

ARO Drilling and IMI collaborated to develop advanced localized capability with the new jack-up rig, "Kingdom-1," equipped with the latest technology to enhance operational excellence and safety.

Both companies are Aramco joint ventures and are products of Aramco's iktva program. Kingdom-1 is part of a bigger industrialization program that aims to localize the rig-building business and create jobs for Saudi citizens, providing them with valuable experience and training.



1. These programs include the Vocational College Internship Program (VCIP), University Internship Program (UIP), Summer enrichment program, Tomooh program, Advantage program, and Arizona Centers for Comprehensive Education and Life Skills (ACCEL) International Ajyal Center.

* Metric reported for the first time externally.

Labor practices and national content continued

National Champions

Aramco's National Champions program is envisioned to be a world-class cluster of innovation that drives business and job creation, and supports national economic growth. In this program, we act as an incubator to convert lucrative business ideas into investment opportunities into thriving National Champions, enabling job creation and economic growth.

Local successes

Both in Saudi Arabia and abroad, we have established different initiatives to continue to grow societal value wherever we operate. Some notable examples of our National Champions' recent efforts are presented over the next three pages.

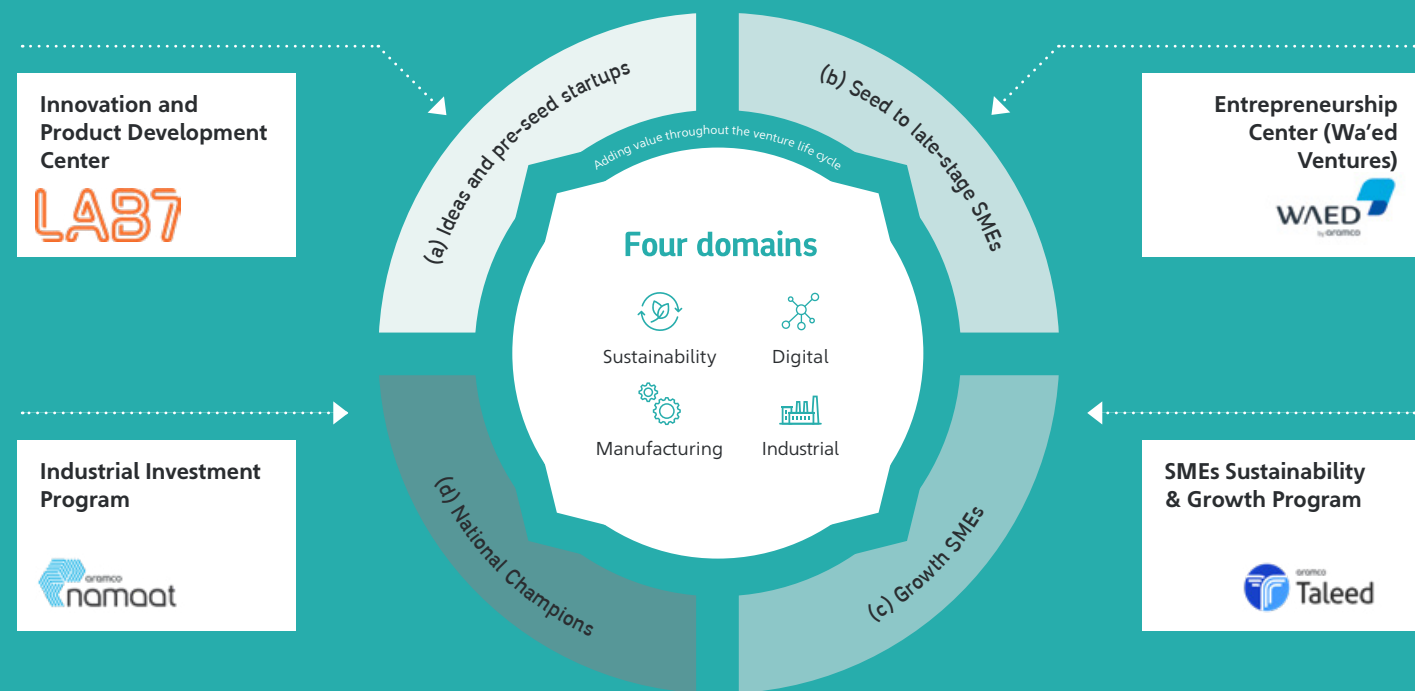
Spotlight on National Champions

Supporting economic diversification in Saudi Arabia

Aramco's National Champions program is unique in its scale of contribution to a local economy. Since the inception of our National Champions program, we have managed to finalize investments that are projected to create over 46,400 jobs and potentially contribute over \$14.3 billion to Saudi Arabia's GDP.

The program is focused around four domains – manufacturing, industrial, sustainability and digital – to drive development from an initial idea through to a global business.

Our program focuses on four domains:



World-class

A world-class cluster of innovation that drives business and job creation, and national economic growth

+46k

Potential jobs creation

+\$14 billion

Potential impact to Saudi Arabia's GDP

LAB7

The LAB7 Innovation and Product Development Center aims to encourage the growth of the innovation ecosystem and targets the development of disruptive technology-based startups. LAB7 was established to be a quality-feed venture builder that generates high-worth startups for the Kingdom's venture capital (VC) ecosystem.

There are four sectors identified that LAB7 focuses on to enhance the innovation ecosystem in the Kingdom:

- Sustainability e.g., lower energy, GHG emissions mitigation, renewables, and energy storage;
- Manufacturing e.g., nonmetallics, nanotechnology, and additive manufacturing;
- Digitalization e.g., AI, machine learning, cyber security and data analytics; and
- Industrial e.g., advanced robotics.

Wa'ed Ventures

Now a decade old, Wa'ed Ventures is Aramco's \$500 million venture capital fund designed to support the startup ecosystem in Saudi Arabia by investing in local tech-based startups and localizing pioneering global innovations.

In 2023, it launched a Sustainability Venture Builder to diversify the fund's investment portfolio and the Kingdom's local pipeline for startups in the sustainability field. Wa'ed-supported startups include those addressing carbon credit issuance, real-time monitoring for energy, emissions optimization, and the circular economy. It has also advanced localization of four global deals in AI, space, cybersecurity, and 3D printing modular construction.

Some of the notable transactions included:

- Invested \$5 million in Tenderd, which provides AI-generated insights to increase fleet optimization and reduce emissions, targeting capital-intensive industries, such as construction and logistics;
- Invested \$1 million in Excess Materials Exchange, which is a circular economy platform that aims to find circular uses for excess materials and waste streams to reduce their environmental footprint; and
- Invested \$0.5 million in Mighty Buildings, which is a construction technology company that creates sustainable high-quality homes using materials science, 3D printing, and robotics.



Labor practices and national content continued



Taleed

Taleed supports scalable and sustainable job growth for small and medium-sized enterprises (SMEs) by providing growth acceleration services, including partnership and network building, business development, and investment attraction.

In 2023, Taleed developed a Carbon Net-Zero Support program for the Kingdom's SMEs. The program provides educational workshops and in-person training sessions to SMEs to raise awareness on GHG emissions estimation and mitigation possibilities.

In 2023, over 500 SMEs benefited from this program.

Namaat

Namaat, Arabic for 'growth', works together with major global and local partners collaborating on large-scale investment opportunities, and enables partnerships that support the growth of new, unicorn-scale companies.

In 2023, Namaat successfully developed and obtained Final Investment Decision (FID) for nine transactions, adding \$6.5 billion to our capital enablement figures, resulting in a projected future increase in Saudi Arabia's GDP of \$5.4 billion and projected creation of more than 21,700 jobs.

First steel manufacturing complex in Gulf region

Aramco, along with Baoshan Iron & Steel Co. Ltd. and Saudi Arabia's Public Investment Fund, intend to establish an integrated steel plate manufacturing complex in Saudi Arabia. The first facility of its kind in the Kingdom and the Gulf region when completed, the project aims to enhance the domestic manufacturing sector through localizing the production of heavy steel plates. The facility is expected to have a steel plate production capacity of up to 1.5 million tons per year. It would produce natural gas-based direct reduced iron using an electric arc furnace, which aims to reduce CO₂ emissions from the steel-making process by up to 60% compared to a traditional blast furnace. Additionally, with some modifications, the plant would be compatible with hydrogen as a fuel source potentially reducing CO₂ emissions by up to 90%, subject to hydrogen availability.

Amiral petrochemical facility

Aramco and TotalEnergies awarded engineering, procurement, and construction contracts valued at \$11 billion for the 'Amiral' complex, a future world-scale petrochemicals facility expansion at the SATORP refinery in Jubail. This expansion is expected to attract more than \$4 billion in additional investment in a variety of industrial sectors, including carbon fibers, lubes, drilling fluids, detergents, food additives, automotive parts, and tires. It is also expected to create around 7,000 local direct and indirect jobs.

Human rights in the supply chain

Human rights in the supply chain

Aramco requires its suppliers to share our values and respect human rights. Our Code of Business Conduct applies to our workforce, and our Supplier Code of Conduct (SCoC) applies to our suppliers. The SCoC sets out what we expect our suppliers to conform to in relation to ethical sourcing, labor conditions and human rights.

All of our active suppliers in Saudi Arabia have signed the SCoC, which requires Aramco's suppliers to ensure and respect human rights in Saudi Arabia, such as providing a safe, sanitary, and healthy residential and living environment for all their employees, conducting safety training for employees, providing them with adequate safety equipment and ensuring all the supplier practices comply with the local labor laws.

Our suppliers are prompted to notify Aramco when they become aware of any actual, or potential, violation of the SCoC and communicate plans to correct and remedy such violations.

Aramco routinely assesses its businesses, joint ventures, suppliers, government relationships, acquisitions, mergers, and disposals to ensure adoption of our values, ethics, and standards.

We deliver ethical awareness and SCoC training to our suppliers. Aramco's procurement teams perform inspections of some of our suppliers, especially in high-risk locations, to check for any non-conformance to our SCoC and/or agreed contractual arrangements, such as contractors being provided unsafe accommodation and/or workers being paid below the national minimum wage.

Active suppliers signed up to Aramco's Supplier Code of Conduct (%)

2023	100
2022	100
2021	100



Community and society

Aramco has contributed positively to the Kingdom's development since its inception. Our early efforts between the 1930s and 1970s focused on the Kingdom's infrastructure and industrial development. These efforts were driven by business requirements, but Aramco has increasingly taken a more proactive approach to voluntary citizenship activities. In line with the Kingdom's push to develop a knowledge-based society, the bulk of our citizenship effort today is focused on people's development and environmental stewardship.

\$475 million¹

In 2023, we made social investments of \$475 million¹ in Saudi Arabia and abroad

We believe that the most important source of energy is people, and their ability to create change that benefits them, their local communities, and the environment. Our citizenship activities span multiple fronts: from investing in knowledge and creativity, to conserving the biodiversity of our environment, to supporting the development of local communities and micro-industries.

Social investment

Over many decades, we have delivered social investment programs in Saudi Arabia. From infrastructure, to cultural assets, such as Ithra, to supporting the establishment of sustainable micro-industries, to health and education programs, our investments have made a positive impact on millions of people in the Kingdom.

We are drawing on this experience to support communities and citizens across the globe, mirroring the expansion of our commercial business. Our newly launched Global Citizenship Signature Programs (GSPs) will bring additional scale and impact to Aramco's social investment efforts.

In 2023, we made social investments of \$475 million¹ in Saudi Arabia and abroad. More details on some of these projects is provided on page 90.

Global Citizenship Signature Programs

Aramco is extending its citizenship activities through its GSPs. Launched in September 2023, the GSPs serve as platforms to address important societal issues in a way that allows the Company to make an impact. These programs will draw on the skills of multiple partners across a number of years.

Currently, there are two GSPs. The first focuses on STEM education.

Under this program, Aramco, in partnership with the Network for Teaching Entrepreneurship (NFTE), created a challenge titled 'Aramco Connected Cities Challenge' championed by Ahmad Al-Khowaiter, Executive Vice President of Technology & Innovation. Aramco's challenge attracted the highest number of registrations, with 462 submissions totaling more than 1,688 student participants. Innovation Days were held in India and Saudi Arabia with local non-profit organizations and schools, where students were mentored by Aramco employees to design solutions using emerging technologies and STEM skills to develop more efficient, accessible, or sustainable transportation infrastructure in their communities.

The second GSP focuses on energy access – in particular, providing modern, safe, and efficient cooking stoves to communities in need. In 2023, in partnership with Envirofit International, a leading social enterprise, more than 18,000 energy-efficient cooking stoves were distributed to schools and individual homes in India in 2023. Additional GSPs and partnerships are expected in the future.

Aramco-built schools

Since 1954, when we built our first government school, Aramco has delivered the infrastructure and assets to educate over two million students (equivalent to 6% of the total population of Saudi Arabia, as of 2023), working hand-in-hand with the Government of Saudi Arabia. Today, we support 160 schools, including 147 public schools, seven Aramco-based schools, four private schools and two special needs schools, serving approximately 83,000 students and around 8,000 staff. In 2023, Aramco contributed around \$95 million to school maintenance and upgrades and invested an additional \$60 million in school reconstruction.

In addition to maintaining the infrastructure, we provide tailored programs that leverage the Company's skills and knowledge. For example, in 2023, Aramco supported student programs, reaching out to 100 schools and impacting over 10,000 students. These programs encompass a wide range of topics including health care, vocational awareness, Company premises visits, environmental initiatives, and renewable energy. These initiatives have empowered students to make informed decisions about their health, future careers, safety, and environmental conservation.



Award

Community Services wins the Global Infrastructure & Building Award for Aramco's smart city platform A'amer

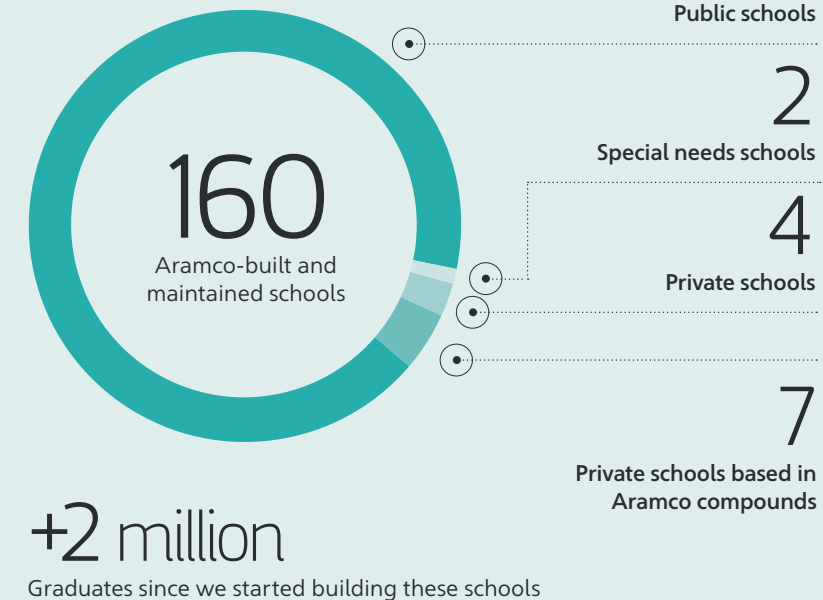
Aramco's Community Services received the award at the Smart City Expo World Congress in Spain, for its integrated platform, A'amer. The platform elevates urban living through integrated citywide services such as optimizing building operations, predictive maintenance, space planning, and asset management. A'amer provides efficiency and sustainability benefits, including annual savings of 1.7 billion gallons of water and 20.5 GWh of energy.



Sustainability in action

Aramco-built schools

In support of educating future generations, Aramco built its first public school in 1954. Since then, Aramco has built and maintained 160 schools in the Kingdom, resulting in over 2 million graduates. Our total impact since the program's inception is shown below:



1. Updated methodology: this is the first year we are reporting on the costs of running Aramco-built schools as part of our social investment. We have also revised the prior year figure to reflect this change. With this updated methodology, the 2022 figure is now \$453 million compared to \$370 million under the previous methodology.

Community and society continued

Global citizenship

During 2023, Aramco contributed \$475 million¹ of social investment in the Kingdom and around the world across various initiatives. The case studies below present some highlights of our projects during the year, in and outside of Saudi Arabia.



Sustainability in action

A snapshot of our social investment projects around the world

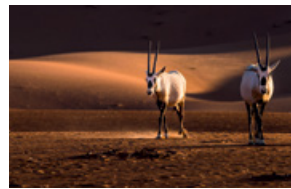
Our social investment has two pillars

Planet investment activities prioritize biodiversity, including reforestation, and coral reef regeneration.

People social investments focus on two key areas of support, knowledge, and creativity and social economic development

Saudi Arabia

While we have highlighted other projects on previous pages in Saudi Arabia, here we present two additional projects that we supported in 2023.



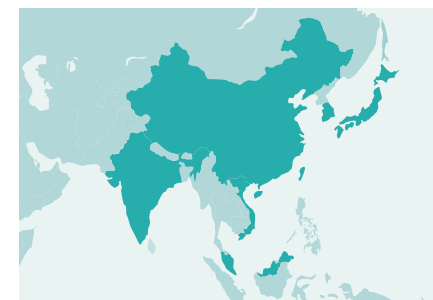
Rub' al-Khali
Rub' al-Khali Restoration Aramco continued its restoration of the Rub' al-Khali to its natural state by preventing key threatening processes (such as off-road driving, hunting), and reintroducing locally extinct species (including ostriches) within a natural, functioning ecosystem maintained at equilibrium and free of non-native species.



Dhahran
Ithra iRead Program The Arab world and promote knowledge-seeking through various activities such as competitions and public enrichment events. In 2023, it received more than 125,000 book reviews from participants and it expanded beyond Saudi Arabia and into the Arab world.

Asia

In Asia, Aramco has supported 10 organizations across China, India, Japan, Malaysia, South Korea, Singapore, and Vietnam, with various environmental, educational, social, and medical initiatives.



South Korea
Ulsan Metropolitan Council We supported Ulsan Metropolitan Council on Social Welfare's recycling education program through the manufacturing of chairs and benches made by blending high-strength concrete and 28 tons of used plastic collected through a five month-long plastic recycling campaign. The recycled chairs and benches are to be installed at eight major tourist locations across Ulsan, including the Taehwa River National Riverside Park in Ulsan.



India
Life Lab Science Program We upgraded the physical infrastructure of government schools by installing low-cost mini science learning centers in 100 schools, benefiting approximately 10,000 students across districts in India.

Europe

In Europe, Aramco has supported 11 non-profit organizations across the Netherlands, Italy, Poland, Spain, and the UK.



The Netherlands
The Friends of Floating Farm Foundation The Friends of Floating Farm Foundation is working in collaboration with different stakeholders and innovative organizations researching circular business models in agriculture. Aramco has supported the Floating Farm

since 2019 and, through its 2023 donation, continues to back research and development into more sustainable and innovative farming techniques. This includes developing a sustainable water desalination unit providing clean freshwater for food production. It serves the Rotterdam area of around 750,000 local residents.



Poland
Perspektywy Foundation Perspektywy is a foundation established to promote and support education. In this partnership, Aramco has assumed patronage of two esteemed and highly popular programs initiated by the foundation: 'Girls as Engineers!' and the 'Perspektywy Women in Tech Summit' – one of the biggest conferences for women in technology, science, and innovation in Europe.

Americas

In the Americas, Aramco has supported 17 non-profit organizations, including national, regional, and/or state charities, in environmental, STEM, and social projects.



United States
Feeding America Feeding America stores emergency food supplies throughout the country for quick distribution in the event of a disaster. Our support has helped to provide over 290,000 meals across the US.



South Texas, United States
Galveston Bay Foundation Helps to clean bay waters from pollutants and protect shorelines from hurricanes. With Aramco's support, the Foundation has planted over 20,000 marsh grass across 1.05 acres of wetlands, with a projected carbon sequestration of approximately 2.1 tons of carbon dioxide annually. Several acres of wetlands have also been readied for future plantings.

Disaster Relief

Complementing our social investment, we have a matched giving program where Aramco matches any donations that our employee makes. Collectively, over \$18 million of donations were given to disaster relief efforts in four countries.

Turkey and Syria, Earthquake Relief: 23,895 employees raised \$3.2 million. Aramco matched these donations resulting in total combined donations of \$6.3 million.

China, Typhoon Relief: total donation amount \$3 million.

Palestine, Gaza Relief Campaign: 21,711 employees raised more than \$3.4 million. With Company match, total combined donation is \$6.8 million.

Sudan, Humanitarian Relief: 12,180 employees raised \$1.1 million dollars. Aramco matched these donations resulting in total combined donations of \$2.2 million.

\$18+ million

Aramco and its employees collectively donated over \$18 million for disaster relief around the world

1. Updated methodology: this is the first year we are reporting on the costs of running Aramco-built schools as part of our social investment. We have also revised the prior year figure to reflect this change. With this updated methodology, the 2022 figure is now \$453 million compared to \$370 million under the previous methodology.

Community and society continued



Volunteering

Aramco fosters a volunteering and giving mindset among both employees and community members across a range of programs and initiatives. This includes:

- Ramadan supplies Care Box volunteer program;
- Company matched giving programs;
- Partnership with Al Fozan Academy to train students and teachers in volunteering;
- Corporate Blood Donation Campaign;
- Ithra, Aramco’s largest social initiative, offers significant volunteering opportunities to both employees and community members; and
- Globally, in markets where Aramco operates, there are multiple Aramco sponsored volunteer programs.

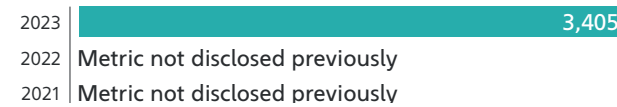
In 2023, Aramco’s employees completed 18,179 volunteering hours.¹

The total number of volunteers increased by 42.4% in line with greater awareness of our volunteering program and our ambition to continue increasing our community engagement.

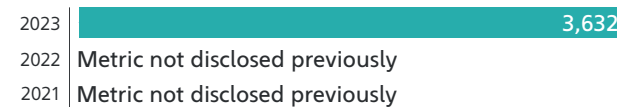
Total number of volunteers¹



Number of employee volunteers^{*1}



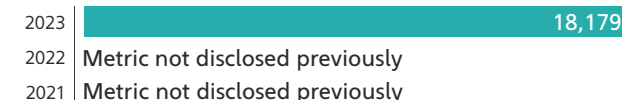
Number of Aramco facilitated community volunteers^{*1}



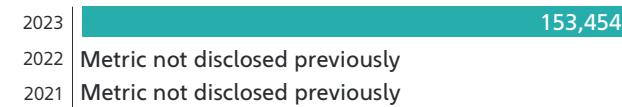
Total number of volunteering hours¹



Number of employee volunteering hours^{*1}



Number of Aramco facilitated community volunteering hours^{*1}



Economic contribution

Economic contribution

Operating in over 30 countries and engaging across the entire value chain, Aramco strives to create value and foster positive economic impacts in every location we serve. In addition to our cumulative iktva GDP contribution of \$202.9 billion in Saudi Arabia, we have made \$475 million¹ in social investments supporting a range of social and environmental initiatives around the world. Our payments to governments in the various countries where we do business reached \$205 billion³.

Social investments¹
(\$ million)
475
(2022: 453)

Revenue
(\$ billion)
441
(2022: 535)

Payments to Saudi and foreign governments³
(\$ billion)
205
(2022: 229)

Net income
(\$ billion)
121
(2022: 161)

R&D spend
(\$ billion)
1.4²
(2022: 1.2)

Cumulative iktva GDP contribution^{*}
(\$ billion)
202.9
(2022: 166.0)

Dividends⁴
(\$ billion)
102
(2022: 79)



Sustainability in action

Promoting sports in our local community

Al-Qadsiah Club, founded in 1967 in Khobar (close to our head office in Dhahran), is a Saudi sports club. The Ministry of Sports’ announcement of Aramco’s full acquisition of Al-Qadsiah Club as part of the Kingdom’s privatization program, in support of the Kingdom’s vision to build a world-class local sports environment, has positively impacted the club and catapulted it into a leading position in the Kingdom, on and off the pitch, making it a source of excitement and pride for the local community.

Post announcement, we have already made progress in achieving our vision during the past six months.

Our women’s sports offered at Al-Qadsiah Club have nearly quadrupled, from three to 11 sports, with the number of players increasing substantially, from 33 to 137. The men’s multi-sports section has also expanded by over 25% from 15 to 19 sports, resulting in an increase of players from 427 to 725 players.

The club’s facilities transformation is ongoing, with major upgrades in the sports and administrative facilities, including but not limited to purchasing of over 100 new sets of gym equipment, 35 sets of medical equipment, building a new multisport training pitch, expanding the youth accommodation, and refurbishing the club’s store.

Our efforts have borne fruit with our female football team currently ranked second in the Women’s Premier League and our male football team ranking first in the Saudi First Division League.

Across various national and international competitions, our female athletes have won 22 bronze, 18 silver, and 21 gold medals in several sports, including judo, swimming, and cycling. Our male athletes have also won 34 bronze, 18 silver, 35 gold medals across several sports.

* Metric reported for the first time externally.

1. Updated methodology: this is the first year we are reporting on the costs of running Aramco-built schools as part of our social investment. We have also revised the prior year’s figure to reflect this change. With this updated methodology, the 2022 figure is now \$453 million compared to \$370 million under the previous methodology.

2. This figure covers entities under Aramco Group.

3. Figure includes income taxes, royalties and dividends to the Saudi government.

4. Dividends paid includes dividends to shareholders and non-controlling interests in subsidiaries.

* Metric reported for the first time externally.

1. Increased data management identified that in the 2022 Sustainability Report, Aramco’s volunteering hours consisted of not only employees’ volunteering hours but also members of our communities. Therefore, from 2023 onwards, Aramco will now separately report the ‘number of volunteers’ and ‘number of volunteering hours’ for both employees and members of community volunteering with Aramco.

Governance



Transparency, oversight and accountability
Al-Ula, Saudi Arabia

The Board of Directors is responsible for the overall management and supervision of the Company, and oversees effective governance, risk, and compliance standards.

Governance

Aramco’s sustainability governance model strives to align its sustainability aspirations and targets with its corporate business strategy and goals. At the Board level, we have the Sustainability, Risk and HSE (Health, Safety and Environment) Committee, which provides oversight over Aramco’s plans and performance, and advises Aramco’s sustainability, risk and HSE policies and practices.

At the Company level, we have the Group Health, Safety, Security, and Environment Committee (GHSSE), which establishes the Company’s health, safety, security, and environmental policies and reviews key issues, and the Sustainability Steering Committee (SSC), which identifies and guides sustainability-related issues to help Aramco assess potential impacts on long-term value creation for stakeholders and the business.

Governance

As a leading oil and gas company, we recognize the importance of good governance, which is integral to fostering transparency, accountability, and ethical conduct across all facets of our business. Our commitment to sound governance practices not only safeguards the interests of our stakeholders, but also enhances our operational efficiency and long-term sustainability.

By maintaining a robust governance structure, we aim to build trust with our investors, partners, and communities while promoting a culture of responsible decision making and strategic planning. Through effective governance, we aspire to navigate the dynamic challenges of the industry, drive innovation, and deliver value to our shareholders and the broader society.

The Board of Directors (Board) of Aramco oversees the Company’s management, providing strategic leadership and guidance, as well as assessing business opportunities, risks, and risk mitigation controls. The Board oversees the Company’s governance, risk, compliance regime, and sustainability performance.

The Chairman of the Board is H.E. Yasir O. Al-Rumayyan. The current members of the Board include high-ranking Saudi Government officials and former senior executives from the international oil and gas, chemical, petroleum refining, petrochemical, and finance industries.

Our sustainability governance

Our Board

Our Board members and senior executives exercise oversight over the Company’s financial and sustainability strategy and performance. In 2023, Board meetings achieved full attendance, with all Board members attending each meeting. The Company has 11 Board members, with five out of 11 members being independent.

The Board Sustainability, Risk and HSE Committee provides leadership, direction, and oversight with respect to environmental, social, and governance matters. The Committee provides advice on sustainability, risk, and HSE-related matters to ensure comprehensive discussion, understanding, ownership, and promotion of these matters on the Board. The Committee, meeting quarterly, assesses HSE performance, including health and safety incidents, and endorses our sustainability reports.

	2023	2022	2021
Board composition by average age ¹	63.45	62.45	61.45
Board composition by average tenure	7	6	5
Board members’ average attendance (%)	100	100	97
Number of independent Board members	5	5	5
Board diversity (number of females on the Board)	1	1	1



Sustainability in action

Establishment of the New Energies Organization

To ensure we progress in our sustainability ambitions, it’s imperative our corporate and organizational governance is agile and fit-for-purpose.

Thus, in 2023, the New Energies organization was established following the endorsement of the long-term strategy to achieve the Company’s ambitions for lower carbon solutions to meet its GHG emissions mitigation ambition.

New Energies has so far consolidated three new energies verticals, covering Renewables, Hydrogen, and Carbon Capture & Storage. Moreover, New Energies aims to nurture robust and more sustainable new energies businesses locally and

globally, capitalizing on emerging opportunities to develop capabilities and revenues in strategic growth markets.

Over the next few years, we have allocated around 10% of our capital investments in New Energies to help us progress in our GHG emissions mitigation and abatement journey.



1. For the 2023 Sustainability Report, the average age for 2023, 2022, and 2021 is calculated for each corresponding calendar year (i.e., January 1 – December 31). In previous years, the reporting time period extended beyond the calendar year, therefore, figures for previous years have been re-calculated herein to reflect this update of the reporting period.

Governance continued

Corporate committees

Responsibility for sustainability at the Company rests with the President and CEO, the Group Executive Committee, and the Group Strategy Committee, reinforced by the Group Health, Safety, Security, and Environment Committee and the Sustainability Steering Committee.

The Company's GHSSE Committee, led by the President and CEO, shapes Aramco's health, safety, security, and environmental policies, scrutinizing material issues, such as safety initiatives, environmental and safety performance, compliance reviews, major incidents, insurance survey outcomes, and cybersecurity.

Sustainability Steering Committee (SSC)

Under the guidance of the Executive Vice President of Strategy and Corporate Development, the SSC reports to both the Group Strategy Committee and Group Executive Committee. Comprising Senior Vice Presidents representing key Business Lines and Administrative Areas, the SSC reviews and guides decisions and strategies related to sustainability, and enables the Company to assess potential impacts on long-term value creation for stakeholders and the business.

The SSC evaluates the Company's GHG mitigation plans and corporate risk assessments for items related to sustainability. Outcomes from these evaluations are presented to and endorsed by the Group Executive Committee before final approval by the Board.

Executive remuneration

Senior executive remuneration is linked to the Company's sustainability performance, featuring a framework that incorporates fixed and variable components. The variable remuneration aligns with the market and is contingent upon meeting predefined performance goals, including sustainability metrics such as GHG emissions intensity, flaring, and safety.

Two distinct variable pay plans are employed: the Short-Term Incentive Plan (STIP), an annual cash-based initiative rewarding performance in financial, operational, safety, and sustainability areas, and the Long-Term Incentive Plan (LTIP), designed to recognize key financial, strategic, and environmental/ sustainability achievements over a three-year period.

Ethics and compliance

Anti-bribery and anti-corruption

The Company has a zero-tolerance policy for unethical behavior, expecting employees and business partners to adhere strictly to the principles outlined in its policy, covering anti-bribery, anti-corruption, and anti-fraud.

Code of Business Conduct

Aramco's Code of Business Conduct encompasses principles regulating anti-bribery and anti-corruption. Aramco mandates an enterprise-wide online training program for Code of Business Conduct compliance, supported by detailed policies, implementing procedures, and guidelines. These procedures operationalize and support our anti-bribery and anti-corruption policies, including provisions for third-party due diligence, gifts, meals, entertainment, and travel.

Aramco provides an anonymous 24-hour hotline, the General Auditor Hotline, accessible to employees, suppliers, and stakeholders for reporting suspected misconduct, including allegations related to bribery or corruption. This hotline, detailed on Aramco's website, facilitates reporting through various channels, including email, telephone, or the Aramco

intranet. Aramco maintains a zero-tolerance stance against any form of retaliation for good-faith reporting of suspected misconduct. As part of continuous program enhancements, committees review findings of misconduct, ensuring the prompt implementation of appropriate and consistent remedial measures.

As part of our ongoing improvements to our compliance program, we have committees to evaluate findings of misconduct committed by personnel and/or third parties to ensure timely execution of appropriate remedial actions.

In 2023, there was a 22.6% increase (2023: 27,674 versus 2022: 22,575) in the anti-bribery and anti-corruption training hours provided to our workforce. This is in line with our goal to constantly keep our workforce vigilant of bribery and corruption risks.

The number of allegations received from Aramco employees increased in 2023 in comparison to 2022. The proliferation of digital technology and data analytics tools across the Company, coupled with increased awareness programs, enables our employees to voice concerns and allegations.

Sustainability governance management framework



Anti-bribery and anti-corruption training hours



Number of allegations received



1. Effective January 1, 2023, the Corporate Development business line title was updated to Strategy & Corporate Development.

Data

The following table presents Aramco's sustainability metrics for the years 2023, 2022, and 2021. Reporting boundaries for each metric and for each year are shown for transparency, and where possible, comparability. There are three common terms in reference to the metrics' reporting boundaries and the definitions of the commonly used terms are:

- **Company in-Kingdom** — Saudi Arabian Oil Company in-Kingdom wholly-owned operated assets.
- **Operational control** — Saudi Arabian Oil Company in-Kingdom wholly-owned operated assets, SASREF, Motiva, ARLANXEO, Aramco Trading Company (ATC), Aramco Services Company (ASC), Aramco Overseas Company B.V. (AOC) and Saudi Aramco Asia Company Ltd. (SAAC).
- **Group** — Saudi Arabian Oil Company, together with its consolidated subsidiaries, and where the context requires, its joint operations, joint ventures and associates.



Our metrics

Material topic	Metric (unit of measure)	2023 actual	2023 boundaries	2022 actual	2022 boundaries	2021 actual	2021 boundaries	
Climate change and the energy transition								
Climate change	Scope 1 emissions (million metric tons of CO ₂ e)	54.4** ¹	Operational control excluding ATC, ASC, AOC and SAAC	55.7** ¹	Operational control excluding ATC, ASC, AOC and SAAC	52.3** ¹	Operational control excluding ATC, ASC, AOC and SAAC	
	Scope 2 emissions (million metric tons of CO ₂ e) Location-based	18.2** ¹	Operational control excluding ATC, ASC, AOC and SAAC	16.1** ¹	Operational control excluding ATC, ASC, AOC and SAAC	15.5** ¹	Operational control excluding ATC, ASC, AOC and SAAC	
	Scope 2 emissions (million metric tons of CO ₂ e) Market-based	13.0** ¹	Operational control excluding ATC, ASC, AOC and SAAC	10.3** ¹	Operational control excluding ATC, ASC, AOC and SAAC	Metric not disclosed previously		
	Upstream carbon intensity (Ratio of total upstream GHG emissions (Scopes 1 and 2) to production sold, kg CO ₂ e/boe) Location-based	10.7**	Operational control	10.3**	Operational control	10.7**	Operational control	
	Upstream carbon intensity (Ratio of total upstream GHG emissions (Scopes 1 and 2) to production sold, kg CO ₂ e/boe) Market-based	9.6**	Operational control	9.3**	Operational control	Metric not disclosed previously		
	Upstream methane emissions (metric tons of CH ₄)	27,708	Operational control	29,193	Operational control	26,754	Operational control	
	Upstream methane intensity (methane emissions from upstream operations per volume of marketed natural gas, %)	0.05	Operational control	0.05	Operational control	0.05	Operational control	
	Flaring intensity ³ (volume of hydrocarbon gas flared per barrel of oil equivalent produced, scf/boe)	5.64** ¹	Operational control	4.60** ¹	Operational control	5.51** ¹	Operational control	
	Flared gas ³ (MMscf)	27,506 ¹	Operational control	23,818 ¹	Operational control	25,825 ¹	Operational control	
	Energy intensity ³ (ratio of total net energy consumption and total production, thousand Btu per boe)	153.8	Operational control	146.2 ^{1,2}	Operational control	116.6** ^{1,2}	Company in-Kingdom	
	Energy consumption* (MMBtu/hr)	85,649	Operational control	Metric not disclosed previously		Metric not disclosed previously		
	% of patents filed relating to sustainability technologies* (sustainability patents filed/total patents filed, %)	20	Operational control (including Global Research Centers)	15	Operational control (including Global Research Centers)	14	Operational control (including Global Research Centers)	
	% of sustainability-related R&D out of total R&D spend*	63	Company in-Kingdom plus Global Research Centers, SASREF, Motiva, ATC, ASC, AOC and SAAC	59	Company in-Kingdom plus Global Research Centers, SASREF, Motiva, ATC, ASC, AOC and SAAC	52	Company in-Kingdom plus Global Research Centers, SASREF, Motiva, ATC, ASC, AOC and SAAC	
Safe operations and people development								
Workforce protection	Number of fatalities	3**	Operational control	5**	Operational control	1**	Operational control	
	Fatal accident rate* (number of recordable workforce fatalities x100,000,000/total work hours)	0.305**	Operational control	Metric not disclosed previously		Metric not disclosed previously		
	Lost time injuries/illnesses rate (Number of LTI cases x 200,000/total work hours)	0.018**	Operational control	0.014**	Operational control	0.017	Operational control	

* Metric reported for the first time externally.
 ** This figure has undergone/undergoing external limited assurance in accordance to the ISAE 3000 (revised). Upon completion of assurance, the assurance report can be found [online](#) on the Sustainability section of our website.
 1. Jazan Refinery was excluded from our GHG reporting in 2022 and 2021, while the energy metrics were excluded in 2021. In 2022, it remained in the startup and stabilization phase, and we began reporting associated energy metrics. In 2023, in addition to the energy metrics, the stabilized units of Jazan Refinery were included in the reporting of our GHG emissions and flaring metrics.
 2. As we progress on our reporting journey and our controls around ESG data mature, for this metric from 2022 onwards, we have expanded the reporting boundary from Company in-Kingdom to operational control. The 2021 figure is at a Company in-Kingdom level only.
 3. This metric is not applicable to our office-based entities: ATC, ASC, AOC and SAAC.

Material topic	Metric (unit of measure)	2023 actual	2023 boundaries	2022 actual	2022 boundaries	2021 actual	2021 boundaries
Safe operations and people development continued							
Workforce protection continued	Total recordable case rate (Total recordable incidents x 200,000/total work hours)	0.042	Operational control	0.050	Operational control	0.054	Operational control
	Health performance (Number of overdue major health findings x 100/total number of open major health findings) (%)	19**	Operational control excluding ATC, ASC, AOC and SAAC	15**	Operational control excluding ATC, ASC, AOC and SAAC	15	Operational control excluding ATC, ASC, AOC and SAAC
Process safety and asset integrity	Number of Tier 1 process safety events	15	Operational control	11	Operational control	11	Operational control
Human rights	Number of grievances raised	230	Company in-Kingdom	293	Company in-Kingdom	236	Company in-Kingdom
	Sites with a grievance mechanism in place (%)	100	Company in-Kingdom	100	Company in-Kingdom	100	Company in-Kingdom
Labor practices	Attrition rate (%)	2.2	Company in-Kingdom	2.4	Company in-Kingdom	2.8	Company in-Kingdom
	Number of Company employees	73,311	Company in-Kingdom	70,496	Company in-Kingdom	68,493	Company in-Kingdom
	Breakdown of Company employees (by age) ⁴						
	– 35 years and under	45,277	Company in-Kingdom	45,043	Company in-Kingdom	44,271	Company in-Kingdom
	– Between 36-44 years old	14,464	Company in-Kingdom	12,771	Company in-Kingdom	12,023	Company in-Kingdom
	– 45 years and above	13,570	Company in-Kingdom	12,682	Company in-Kingdom	12,199	Company in-Kingdom
	Number of female employees	5,294	Company in-Kingdom	4,503	Company in-Kingdom	3,802	Company in-Kingdom
	Female (%) of total employees	7.2	Company in-Kingdom	6.4	Company in-Kingdom	5.6**	Company in-Kingdom
	Number of female employees in leadership positions	233	Company in-Kingdom	176	Company in-Kingdom	136	Company in-Kingdom
	Female (%) of total number of new hires	24.1	Company in-Kingdom	28.4	Company in-Kingdom	31.2	Company in-Kingdom
Female employees in leadership positions (%)	4.8	Company in-Kingdom	3.8	Company in-Kingdom	3.1	Company in-Kingdom	
Number of contractor employees	8,125	Company in-Kingdom	7,639	Company in-Kingdom	6,339	Company in-Kingdom	
Number of nationalities in the workforce*	94	Company in-Kingdom	90	Company in-Kingdom	90	Company in-Kingdom	
Employees acknowledging performance review meetings ¹ (%)	92.0	Company in-Kingdom	90.6	Company in-Kingdom	96.8	Company in-Kingdom	
Employee engagement score (%)	Not applicable as this survey is done every two years		85	Company in-Kingdom	Not applicable as this survey is done every two years		
Total hours of training and development ³ (million)	9	Company in-Kingdom	Please refer to footnote 2 below		Please refer to footnote 2 below		
Total hours of training and development (per employee) ⁴	95	Company in-Kingdom	Please refer to footnote 2 below		Please refer to footnote 2 below		
Number of hired graduates	1,665	Company in-Kingdom	1,459	Company in-Kingdom	1,447	Company in-Kingdom	
Number of apprentices (new intake)	2,200	Company in-Kingdom	1,728	Company in-Kingdom	1,369	Company in-Kingdom	
Number of interns	3,201	Company in-Kingdom	3,190	Company in-Kingdom	1,922	Company in-Kingdom	

* Metric reported for the first time externally.
 ** This figure has undergone external limited assurance in accordance to the ISAE 3000 (revised). The assurance report can be found [online](#) on the Sustainability section of our website.
 1. In accordance with our ongoing review of our sustainability performance data, we have determined that the metric “Employees receiving regular performance reviews (%)” reported in 2022 and 2021 should be renamed “Employees acknowledging performance review meetings (%)” in order to more accurately reflect what this metric entails.
 2. Updated methodology: in 2023, a ministerial decision was issued mandating that any establishment with 50 employees and above shall disclose its training data annually as per a specific procedural guide. Therefore, the 2023 training and development hours are reported using the methodology as outlined by the Ministry Procedural Guidelines. 2022 and 2021 previously reported numbers in the 2022 Sustainability Report would not be comparable under this methodology, thus these figures have not been disclosed in this report.
 3. In line with the new methodology of calculating the training hours, the total number of training hours includes all training offered corporate-wide during the year for all employee categories in addition to trainees and contractors.
 4. Total hours of training and development (per employee) metric consists of total training offered by the company during the year for all participants including Aramco employees, contractors and average levels of trainees.

Our metrics continued

Material topic	Metric (unit of measure)	2023 actual	2023 boundaries	2022 actual	2022 boundaries	2021 actual	2021 boundaries
Minimizing environmental impact							
Local environmental impact	Number of hydrocarbon spills ¹ Total number of accidental release events of liquid petroleum hydrocarbon into the environment, where the spill incident is > 1 bbl	12	Operational control	15	Operational control	13	Operational control
	Volume of hydrocarbon spills ¹ (barrels) Total volume of liquid petroleum hydrocarbon accidentally released into the environment, where the spill incident is > 1 bbl	8,566**	Operational control	142,885**	Operational control	14,447	Operational control
	Recovered hydrocarbon ¹ (%) Percentage of liquid petroleum hydrocarbon removed from the environment via recovery methods	88**	Operational control	9**	Operational control	94	Operational control
	Hydrocarbon discharge to water ¹ (barrels) The total of hydrocarbons that are systematically released to surface water through regulated industrial wastewater discharges	14.3**	Operational control	16.4**	Operational control	30.7	Operational control
	SOx emissions (metric kilotons) ^{1,4} Quantity of sulfur oxides including sulfur dioxide (SO ₂) and sulfur trioxide (SO ₃) expressed as SO ₂ equivalent	146**	Operational control	167**	Operational control	141	Operational control
	Sites with ISO 14001 certification ¹ (%)	100**	Operational control	98**	Operational control	Metric not disclosed previously	
	Biodiversity	Net positive impact ¹ (%) (total biodiversity areas (km ²)/ Footprint area (km ²) x 100)	85.6** ⁵	Operational control	53.0**	Operational control	Metric not disclosed previously
Water management	Freshwater consumption (million m ³) The difference between the volume of freshwater removed from the environment, incl. surface water, groundwater, for use in operations, and freshwater returned to the source. The total dissolved solids (TDS) concentration of this type of water is up to 2,000 mg/l	89.9**	Operational control excluding ATC, ASC, AOC and SAAC	93.6**	Operational control excluding ATC, ASC, AOC and SAAC	94.6	Operational control excluding ATC, ASC, AOC and SAAC
	Freshwater withdrawal (million m ³)	135.7	Operational control excluding ATC, ASC, AOC and SAAC	136.6	Operational control excluding ATC, ASC, AOC and SAAC	137.3	Operational control excluding ATC, ASC, AOC and SAAC
	Freshwater intensity (m ³ /boe)* Total freshwater consumed relative to our hydrocarbon production	0.02	Operational control excluding ATC, ASC, AOC, SAAC	Metric not disclosed previously	Metric not disclosed previously		
	Product stewardship and waste management	Industrial waste disposed ^{1,2,3} (metric tons) Total amount of industrial waste, hazardous and nonhazardous, generated from operating facilities, not including waste recycling, reusing, and recovery	481,561	Operational control	318,656	Operational control	240,255
	– Industrial waste disposed – Upstream ¹ (metric tons)	253,044	Operational control	Breakdown not previously disclosed			
	– Industrial waste disposed – Downstream ¹ (metric tons)	174,790	Operational control	Breakdown not previously disclosed			
	Industrial waste recycled ¹ (%)	35.7**	Operational control	39.9**	Operational control	39.8	Operational control

* Metric reported for the first time externally.
 ** This figure has undergone external limited assurance in accordance to the ISAE 3000 (revised). The assurance report can be found [online](#) on the Sustainability section of our website.
 1. This metric is not applicable to our office-based entities: ATC, ASC, AOC and SAAC.
 2. The name of this metric was changed from industrial waste generated to industrial waste disposed in 2023. The definition of the metric remained the same.
 3. Industrial waste disposed number includes operationally controlled affiliates and other waste streams not generated by upstream and downstream operations.
 4. The Jazan Refinery is excluded from our SOx reporting in 2022 and 2021. In 2023, data from Jazan Refinery's stabilized units is included in our SOx reporting.
 5. Ongoing management and review of the BPAs resulted in exclusion of the Manifa BPA from our NPI metric as a BPA, pending implementation of enhancements to align with the Company's biodiversity governance.

Material topic	Metric (unit of measure)	2023 actual	2023 boundaries	2022 actual	2022 boundaries	2021 actual	2021 boundaries
Growing societal value							
Labor practices	Number of people on Aramco sponsored community programs ¹	15,099	Company in-Kingdom	12,160	Company in-Kingdom	9,010	Company in-Kingdom
National content	Saudization (% of Saudi nationals as part of Aramco's workforce)	90.3	Company in-Kingdom	90.9	Company in-Kingdom	90.5	Company in-Kingdom
	Saudization of construction contracts (%) Percentage of Saudi construction contractors relative to the total construction contractors' workforce	29.7	Company in-Kingdom	28.0	Company in-Kingdom	25.6	Company in-Kingdom
	Saudization of service contracts (%) Percentage of Saudi service contractors relative to the total service contractors' workforce	56.2	Company in-Kingdom	57.2	Company in-Kingdom	56.6	Company in-Kingdom
	iktva procurement spend within the Kingdom (%)	65.0	Company in-Kingdom	63.0	Company in-Kingdom	59.0	Company in-Kingdom
	Cumulative iktva GDP contribution* (\$ billion)	202.9	Company in-Kingdom	166	Company in-Kingdom	136	Company in-Kingdom
	Human rights	% of active suppliers signed up to Aramco's Supplier Code of Conduct	100	Company in-Kingdom	100	Company in-Kingdom	100
	Number of active suppliers	3,472	Company in-Kingdom	3,199	Company in-Kingdom	Metric not disclosed previously	
Community and society	Social investment (\$ million) ²	475	Company in-Kingdom plus ASC, AOC and SAAC	453	Company in-Kingdom plus ASC, AOC and SAAC	Metric not disclosed previously	
	Total number of volunteers ³	7,037	Company in-Kingdom plus ASC, AOC and SAAC	4,941	Company in-Kingdom plus ASC, AOC and SAAC	4,153	Company in-Kingdom
	Total number of volunteering hours ³	171,633	Company in-Kingdom plus ASC, AOC and SAAC	168,590	Company in-Kingdom plus ASC, AOC and SAAC	136,284	Company in-Kingdom
	Number of employee volunteers ³	3,405	Company in-Kingdom plus ASC, AOC and SAAC	Metric not disclosed previously	Metric not disclosed previously		
	Number of employee volunteering hours ³	18,179	Company in-Kingdom plus ASC, AOC and SAAC	Metric not disclosed previously	Metric not disclosed previously		
	Number of Aramco facilitated community volunteers ³	3,632	Company in-Kingdom plus ASC, AOC and SAAC	Metric not disclosed previously	Metric not disclosed previously		
	Number of Aramco facilitated community volunteering hours ³	153,454	Company in-Kingdom plus ASC, AOC and SAAC	Metric not disclosed previously	Metric not disclosed previously		

* Metric reported for the first time externally.
 1. These programs include the Vocational College Internship Program (VCIPI), University Internship Program (UIP), Summer enrichment program, Tomooh program, Advantage program, and Arizona Centers for Comprehensive Education and Life Skills (ACCEL) International Ajyal Center.
 2. Updated methodology: this is the first year we are reporting on the costs of running Aramco-built schools as part of our social investment. We have also revised the prior year figure to reflect this change. With this updated methodology, the 2022 figure is now \$453 million compared to \$370 million under the previous methodology.
 3. Increased data management identified that in the 2022 Sustainability Report, Aramco's volunteering hours consisted of not only employees' volunteering hours but also members of our communities. Therefore, from 2023 onwards, Aramco will now separately report the 'number of volunteers' and 'number of volunteering hours' for both employees and members of community volunteering with Aramco.

Our metrics continued

Material topic	Metric (unit of measure)	2023 actual	2023 boundaries	2022 actual	2022 boundaries	2021 actual	2021 boundaries
Growing societal value continued							
Economic contribution	Direct economic value generated and distributed: ¹						
	• Revenues (\$ million)	440,875	Group	535,188	Group	359,181	Group
	• Other income related to sales (\$ million)	54,158	Group	69,178	Group	41,287	Group
	• Operating costs (\$ million)	263,489	Group	299,279	Group	194,624	Group
	• Employee wages and benefits (\$ million)	16,088	Group	14,665	Group	14,066	Group
	• Dividends paid includes dividends to shareholders and non-controlling interests in subsidiaries ² (\$ million)	101,628	Group	78,863	Group	76,911	Group
	• Payments to Saudi and foreign governments ³ (\$ million)	205,027	Group	229,435	Group	149,775	Group
	• Payments to the Saudi government ³ (\$ million)	199,228	Company in-Kingdom	225,866	Company in-Kingdom	148,542	Company in-Kingdom
	Total R&D expenses ¹ (\$ million)	1,386	Group	1,178	Group	1,033	Group
Governance							
Corporate governance	Board composition by average age ⁴	63.45	Company in-Kingdom ⁵	62.45	Company in-Kingdom ⁵	61.45	Company in-Kingdom ⁵
	Board composition by average tenure	7	Company in-Kingdom ⁵	6	Company in-Kingdom ⁵	5	Company in-Kingdom ⁵
	Board members' average attendance (%)	100	Company in-Kingdom ⁵	100	Company in-Kingdom ⁵	97	Company in-Kingdom ⁵
	Number of independent Board members	5	Company in-Kingdom ⁵	5	Company in-Kingdom ⁵	5	Company in-Kingdom ⁵
	Board diversity (number of females on the Board)	1	Company in-Kingdom ⁵	1	Company in-Kingdom ⁵	1	Company in-Kingdom ⁵
Ethics, bribery, and corruption (compliance)	Number of allegations received through the 24-hour hotline	826	Company in-Kingdom	655	Company in-Kingdom	539	Company in-Kingdom
	Anti-bribery and anti-corruption training hours	27,674	Company in-Kingdom	22,575	Company in-Kingdom	7,300	Company in-Kingdom

1. This metric is converted at a fixed rate of U.S. dollar 1.00 = SAR 3.75 for convenience only.

2. Dividends paid includes dividends to shareholders and non-controlling interests in subsidiaries.

3. Figure includes income taxes, royalties and dividends to Saudi government.

4. For the 2023 Sustainability Report, the average age for 2023, 2022, and 2021 is calculated for each corresponding calendar year (i.e., January 1 – December 31). In previous years, the reporting time period extended beyond the calendar year, therefore, figures for previous years have been re-calculated herein to reflect this update of the reporting period.

5. For this metric, Company in-Kingdom refers to Saudi Arabian Oil Company.

Abbreviations, terms, and glossary

Currencies

Currency conversion

All financial amounts in SAR and USD in this Report are reported in line with the exchange rates reported in Aramco's 2023 Annual Report.

SAR/Saudi Riyal

Saudi Arabian riyal, the lawful currency of the Kingdom

\$/USD/US\$/Dollar

US dollar

Units of measurement

Barrel (bbl)

Barrels of crude oil, condensate or refined products

boe

Barrels of oil equivalent

bscf

Billion standard cubic feet

bscfd

Billion standard cubic feet per day

Btu

British thermal unit

GW

Gigawatts

Mboed

Thousand barrels of oil-equivalent per day

MMboed

Million barrels of oil-equivalent per day

MMscf

Million standard cubic feet

MMtpa

Million metric tons per annum

MMtCO₂e

Million metric tons of carbon dioxide equivalent

MW

Megawatts

kg CO₂e/boe per day

Volumes are converted into a daily basis using a calendar year (Gregorian)

scf

Standard cubic feet

Ton

Metric ton (equals to 1,000 kg)

Terms and glossary

Affiliate

With respect to financial information, the term Affiliate is defined by IFRS, meaning the Company's subsidiaries, joint arrangements, and associates.

AGOC

Aramco Gulf Operations Company

ARLANXEO

ARLANXEO Holding B.V., a wholly-owned specialty chemicals subsidiary.

ATC

Aramco Trading Company, a wholly-owned subsidiary of Aramco.

BPA

Biodiversity Protection Area

Carbon credit

A carbon credit is a tradable instrument that represents either: a permit to emit one metric ton of CO₂ or equivalent GHG (tCO₂e) into the atmosphere, or a certificate that represents the avoidance or removal of one metric ton of CO₂ or equivalent GHG (tCO₂e) from the atmosphere.

Carbon dioxide (CO₂)

A naturally occurring gas, and also a byproduct of burning fossil fuels and biomass, as well as land-use changes, and other industrial processes. It is the principal greenhouse gas that affects the Earth's radiative balance. It is the reference gas against which other greenhouse gases are measured and therefore has a Global Warming Potential of 1.

Carbon capture, and storage (CCS)

A set of technologies that can mitigate CO₂ emissions from new and existing coal- and gas-fired power plants, industrial processes, and other stationary sources of CO₂. It is a threestep process that includes the capture of CO₂ from power plants or industrial sources; the transport of the captured and compressed CO₂ (usually in pipelines); and underground injection and geologic sequestration, or permanent storage, of that CO₂ in rock formations that contain tiny openings or pores that trap and hold the CO₂.

Sequestration and storage are often used interchangeably.

Carbon capture, utilization and storage (CCUS)

Utilization is where CO₂ is reused in other applications, e.g., food preparation, carbonated drinks manufacturing, etc.

Carbon dioxide equivalent (CO₂e)

A metric measure used to compare the emissions from various greenhouse gases based upon their global warming potential (GWP). Carbon dioxide equivalents are commonly expressed as "million metric tons of carbon dioxide equivalents (MMtCO₂e)." The carbon dioxide equivalent for a gas is derived by multiplying the tons of the gas by the associated GWP: MMtCO₂e = (million metric tons of a gas) x (GWP of the gas).

Abbreviations, terms, and glossary continued

Carbon intensity

A measure of greenhouse gas emissions in carbon dioxide (CO₂) equivalent per barrel released to produce oil equivalent.

Carbon markets

Two types of carbon market exist:

- (1) Regulatory compliance markets – used by companies and governments that by law have to account for their GHG emissions. It is regulated by mandatory national, regional or international carbon reduction regimes.
- (2) Voluntary markets – the trade of carbon credits is on a voluntarily basis.

Carbon offset

Mitigation credits generated in one location that are transferred to another location or entity, and are usually denominated in metric tons of a reduced emission or MWh of renewable energy produced.

CHP

Combined Heat and Power.

Circular carbon economy

A circular carbon economy is a framework for managing and reducing emissions. It is a closed loop system involving 4Rs: reduce, reuse, recycle, and remove.

Circular economy

A circular economy is an economic system designed and built to retain the highest value of company resources by utilizing sustainable and environmental business models.

Climate

Usually defined as the “average weather,” or more rigorously, in terms of the mean and variability of relevant quantities over a period of time ranging from months to millions of years.

Climate change

Any significant change in the measures of climate lasting for an extended period of time. Climate change includes major changes in temperature, precipitation, or wind patterns, among others, that occur over several decades or longer.

Cogeneration

Cogeneration is a method that uses heat and power systems to capture waste heat from gas turbines and convert it into steam. This process captures heat, reducing its escape into the atmosphere, and enables the production of electricity as a natural by-product.

Company

Saudi Arabian Oil Company (The Company).

Concession

As defined and discussed on page 126 of the Aramco Annual Report 2023.

CO₂

Carbon dioxide.

CO₂e

Carbon dioxide equivalent.

Condensate

Light hydrocarbon substances produced with raw gas, which condenses into liquid at normal temperatures and pressures associated with surface production equipment.

Direct Air Capture (DAC)

Technologies and processes that extract CO₂ directly from the atmosphere. The CO₂ can be permanently stored in geological formations or used as a feedstock in the production of fuels, chemicals, building materials, and other products containing CO₂.

Domestic

Refers to the Kingdom of Saudi Arabia.

Emissions

The release of a substance (usually a gas when referring to the subject of climate change) into the atmosphere.

Emissions reduction

Carbon reduction projects result in a net reduction in absolute CO₂/GHG emissions relative to current emission levels or relative to a historical baseline.

Energy efficiency

Using less energy to provide the same service. Energy efficiency is one of the core strategies for reducing greenhouse gas emissions from fossil fuels.

Energy intensity

An index for measuring the total energy consumed to generate a unit of product, represented in thousand Btus per total production in barrel of oil equivalent.

Energy transition

A significant structural change in an energy system.

Environment

The natural world, as a whole or in a particular geographical area, especially as affected by human activity.

ESG

Environmental, social, and governance.

Flaring intensity

Volume of gas flared per barrel of oil equivalent produced (scf/boe).

Freshwater

Groundwater or surface water with total dissolved solids concentration up to 2,000 mg/l.

G20

Group of Twenty is an intergovernmental forum comprising 19 countries and the European Union (EU).

GDP

Gross domestic product. The broadest quantitative measure of a nation’s total economic activity, representing the monetary value of all goods and services produced within a nation’s geographic borders over a specified period of time.

Greenhouse gas (GHG)

Any gas that absorbs infrared radiation in the atmosphere rather than allowing it to radiate into space. Greenhouse gases include CO₂, methane, nitrous oxide, ozone, chlorofluorocarbons, hydrochlorofluorocarbons, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.

GHG avoidance

The avoidance of GHG emissions that would otherwise occur without the protective actions implemented by an offset project.

GHG emission mitigation

The process of reducing CO₂ (GHG) emissions from the Company’s operations.

GHG reduction

A quantified absolute decrease in GHG emissions specifically related to/arising from an activity.

GHG removal

Withdrawal of a GHG and/or a precursor from the atmosphere by a GHG sink or GHG removal technology.

Government

The Government of the Kingdom of Saudi Arabia (and “Governmental” shall be interpreted accordingly).

Greenhouse gas (GHG) emissions

Any gaseous compound in the atmosphere that is capable of absorbing infrared radiation. Generally, consists of water vapor, CO₂, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride. Aramco’s inventory includes CO₂, methane and nitrous oxide.

Greenhouse Gas Protocol

The GHG Protocol establishes comprehensive global standardized frameworks to measure and manage greenhouse gas emissions from private and public sector operations, value chains and mitigation actions. It is a product of the collaboration between the World Resources Institute (WRI) and World Business Council for Sustainable Development (WBCSD).

Group

Saudi Arabian Oil Company, together with its consolidated subsidiaries and, where the context requires, its joint operations, joint ventures and associates.

HSSE

Health, Safety, Security and Environment.

Hydrocarbons

Substances containing only hydrogen and carbon. Fossil fuels are made up of hydrocarbons.

Hydrocarbons law

Law governing hydrocarbons, hydrocarbon resources, and hydrocarbon operations existing within the territory of the Kingdom, enacted by Royal Decree No. M/37, dated 2/4/1439H (corresponding to December 20, 2017), as amended.

IFRS

International Financial Reporting Standard(s) that are endorsed in the Kingdom and other standards and pronouncements endorsed by Saudi Organization for Chartered and Professional Accountants (SOCPA).

iktva

In-Kingdom Total Value Add. The Company’s program to promote the development of a localized energy/industrial ecosystem.

Income tax law/tax law

Income Tax Law issued under Royal Decree No. M/1 dated 15/1/1425H (corresponding to March 6, 2004) and its Implementing Regulations issued under Ministerial Resolution No. 1535 dated 11/6/1425H (corresponding to August 11, 2004), as amended from time to time.

Ipieca

International Petroleum Industry Environmental Conservation Association.

IPO

Initial public offering.

ISO

International Organization for Standardization.

Joint venture/JV

The term joint venture, as defined by IFRS, means a type of joint arrangement whereby the parties that have joint control of the arrangement have rights to the net assets of the joint arrangement.

KAUST

King Abdullah University of Science and Technology.

KFUPM

King Fahd University of Petroleum and Minerals.

Kingdom

Kingdom of Saudi Arabia.

LTI

Lost time injuries/illnesses.

Master Gas System (MGS)

An extensive network of pipelines that connects Aramco’s key gas production and processing sites throughout the Kingdom.

Ministry of Energy, Industry, and Mineral Resources

Ministry of Energy of the Kingdom. Successor to MEIM.

Methane (CH₄)

A hydrocarbon that is a greenhouse gas with a global warming potential most recently estimated at 25 times that of carbon dioxide (CO₂). Methane is produced through anaerobic decomposition of waste in landfills, animal digestion, decomposition of animal wastes, production and distribution of natural gas and petroleum, coal production, and incomplete fossil fuel combustion.

Motiva

Motiva Enterprises LLC – located in the US.

Abbreviations, terms, and glossary continued

Namaat

Aramco's industrial investment program.

National

Refers to the Kingdom of Saudi Arabia.

Natural gas

Underground deposits of gases consisting of 50–90% methane (CH₄) and small amounts of heavier gaseous hydrocarbon compounds such as propane (C₃H₈) and butane (C₄H₁₀).

NDC

Nationally Determined Contributions, or NDCs, are countries' self-defined national climate pledges under the Paris Agreement, detailing what they will do to help meet the goals of the Paris Agreement.

Net-zero emissions

This is achieved when anthropogenic GHG emissions to the atmosphere are balanced by anthropogenic removals.

NGL

Natural gas liquids, which are liquid or liquefied hydrocarbons produced in the manufacture, purification and stabilization of natural gas. For purposes of reserves, ethane is included in NGL. For purposes of production, ethane is reported separately and excluded from NGL.

Nitrogen oxides (NO_x)

Gases consisting of one molecule of nitrogen and varying numbers of oxygen molecules. Nitrogen oxides are produced in the emissions of vehicle exhausts and from power stations. In the atmosphere, nitrogen oxides can contribute to the formation of photochemical ozone (smog), can impair visibility, and have health consequences; they are thus considered pollutants.

Operational control

Saudi Arabian Oil Company in-Kingdom wholly-owned operated assets, SASREF, Motiva, ARLANXEO, Aramco Trading Company (ATC), Aramco Services Company (ASC), Aramco Overseas Company B.V. (AOC) and Saudi Aramco Asia Company Ltd. (SAAC)¹.

Original concession

See definition to "Concession."

PIF

Public Investment Fund of Saudi Arabia.

Production costs

The sum of operating costs and depreciation, reflecting both the erosion of asset value over time on an accounting basis and the cost of operating the business.

R&D

Research and development.

RTP

Reinforced Thermo Plastics.

Lower Carbon Aviation Fuel

Lower Carbon Aviation Fuel (LCAF) is defined in Annex 16 Environmental Protection (Volume IV) of the United Nations International Civil Aviation Organization's Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) as a fossil-based aviation fuel that meets the CORSIA Sustainability Criteria. LCAF can serve as a complementary measure alongside Sustainable Aviation Fuels (SAF) in helping to reduce aviation greenhouse gas (GHG) lifecycle emissions.

Sustainable aviation fuels

Sustainable aviation fuels (SAF) are defined as renewable or waste-derived aviation fuels that meets sustainability criteria as contained within Annex 16 Environmental Protection (Volume IV) of the United Nations International Civil Aviation Organization's Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA).

Reserves

Those quantities of liquids and gas, which by analysis of geoscience and engineering data, can be estimated with reasonable certainty to be economically producible – from a given date forward, from known reservoirs, and under existing economic conditions, operating methods and government regulations – prior to the time at which contracts providing the right to operate expire, unless evidence indicates that renewal is reasonably certain, regardless of whether deterministic or probabilistic methods are used for the estimation. The project to extract the hydrocarbons must have commenced or the operator must be reasonably certain that it will commence the project within a reasonable time.

Reliability

Total products volume shipped/delivered within 24 hours of the scheduled time, divided by the total products volume committed. Any delays caused by factors that are under the Company's control (e.g., terminal, pipeline, stabilization, or production) negatively affect the score, whereas delays caused by conditions that are beyond the Company's control, such as adverse weather, are not considered. A score of less than 100% indicates there were issues that negatively impacted reliability.

SABIC

Saudi Basic Industries Corporation.

SASREF

Saudi Aramco Jubail Refinery Company, a subsidiary of Aramco, formerly known as Saudi Aramco Shell Refinery Company.

SATORP

Saudi Aramco Total Refining and Petrochemical Company, a joint venture established by Aramco and Total Refining Saudi Arabia SAS in 2008.

Saudi Aramco/Aramco

Saudi Arabian Oil Company, together with its consolidated subsidiaries, and where the context requires, its joint operations, joint ventures and associates. Any reference to "us", "we" or "our" refers to Aramco except where otherwise stated.

Unless otherwise stated, the text does not distinguish between the activities and operations of the Company and those of its subsidiaries.

Saudi Green Initiative (SGI)

A national initiative that unites environmental protection, energy transition, and sustainability programs with the overarching aim of offsetting and reducing emissions, increasing the Kingdom's use of clean energy, and addressing climate change.

Scope 1 GHG emissions

Direct emissions, which include GHG emissions from on-site fuel combustion, flaring, venting and fugitive emissions.

Scope 2 GHG emissions

Indirect emissions, which account for GHG emissions from offsite power generation including electricity and steam.

Senior executives/Management Committee

The members of the Senior Management of Aramco holding the title of CEO, President, or Executive Vice President.

Senior management

The senior management and other officers of Aramco who, while subordinate to the senior executives, are still involved in the management of Aramco and participate in driving its strategies, decisions or operations.

Shareholder

Any holder of shares.

Shareek program

A cooperative government program that is designed to provide support via various pillars, including financial, monetary, operational, and regulatory cooperation and asset investment, striving to enhance the development and resilience of the Saudi economy by increasing the gross domestic product, providing job opportunities, diversifying the economy and strengthening cooperation between public and private sectors.

SME

Small and medium enterprise.

SOCPA

Saudi Organization for Chartered and Professional Accountants.

S-Oil

S-Oil Corporation.

SSC

Sustainability Steering Committee.

STEM

Science, technology, engineering and mathematics.

Subsidiaries

Except with respect to financial information, the term subsidiaries means the companies that Aramco controls through its ability to influence the actions or decisions of another person through, whether directly or indirectly, alone or with a relative or affiliate (i) holding 30% or more of the voting rights in a Company, or (ii) having the right to appoint 30% or more of the Board of a Company.

With respect to financial information, the term subsidiaries is defined by IFRS, meaning entities over which the Company has control.

Synthetic fuels

A broad class of hydrocarbon fuels that are chemically synthesized from hydrogen and CO₂ that is captured either directly from the air or from industrial installations.

Tier 1 process safety event

An unplanned or uncontrolled release of any material, including non-toxic and non-flammable materials, from a process that results in one or more of the consequences listed in API Recommended Practice-754.

Total recordable case (TRC) rate

Sum of recordable cases that occurred in the workplace per 200,000 work hours.

UN SDGs

United Nations Sustainable Development Goals.

Upstream carbon intensity

Upstream carbon intensity is calculated based on the total upstream Scope 1 and Scope 2 GHG emissions divided by the upstream marketed production and excludes sales gas own use and AGOC, as found on the assurance statement.

U.S./United States/USA

United States of America.

Well-to-wake

Refers to the entire process from fuel production, and delivery to using on-board ships and GHG emissions produced therein.

Wheeled power

The power generated by an Aramco cogeneration facility and transferred through the electricity grid to be used by another Aramco facility. The transaction is governed by a principle buyer and is enabled by the regulatory frameworks in the Kingdom.

VOC

Volatile organic compounds.

Zero carbon

Applies only to energy sources, processes, products, projects, etc., that emit zero carbon emissions.

¹ Referenced affiliates are separate legal entities that are subject to their own governance frameworks.

Forward-looking statements

This Sustainability Report (the "Report") may contain certain forward-looking statements with respect to Aramco's financial position, results of operations and business and certain of Aramco's plans, intentions, expectations, assumptions, goals and beliefs and include all matters that are not historical fact and generally, but not always, may be identified by the use of words such as "believes," "expects," "are expected to," "anticipates," "intends," "estimates," "should," "strive," "will," "shall," "may," "is likely to," "plans," "targets," "goals," or similar expressions, including variations and the negatives thereof or comparable terminology. These statements include, among other things, statements about expectations in connection with Aramco's sustainability and environmental, social and governance ("ESG") initiatives, including the targets and goals set forth in this Report.

Prospective investors should be aware that forward-looking statements are not guarantees of future of future performance and that Aramco's actual performance may differ significantly from those made in or suggested by these forward-looking statements. Factors that could cause actual results to differ materially from Aramco's expectations, including our goals related to ESG and mitigating our environmental impact, safe operations and people development and growing societal value within the Kingdom, include, among other things, the following:

- the inability to successfully meet the targets set forth in this Report, including through the management GHG emissions; the inability to meet our plastic waste and water management targets or successfully protect biodiversity; the inability to develop and deploy technology solutions to allow us to deliver the benefits of oil and gas hydrocarbons for future generations;
- global supply, demand and price fluctuations of oil, gas and petrochemicals;
- global economic market conditions;
- competition in the industries in which Aramco operates;
- climate change concerns, weather conditions and related impacts on the global demand for hydrocarbons and hydrocarbon-based products;
- risks related to Aramco's ability to successfully meet its ESG targets, including its failure to fully meet its GHG emission reduction targets by 2050;
- conditions affecting the transportation of products;
- operational risk and hazards common in the oil and gas, refining and petrochemicals industries;
- the cyclical nature of the oil and gas, refining and petrochemicals industries;
- political and social instability and unrest and actual or potential armed conflicts in the MENA region and other areas;
- Aramco's exposure to inflation, interest rate risk and foreign exchange risk;

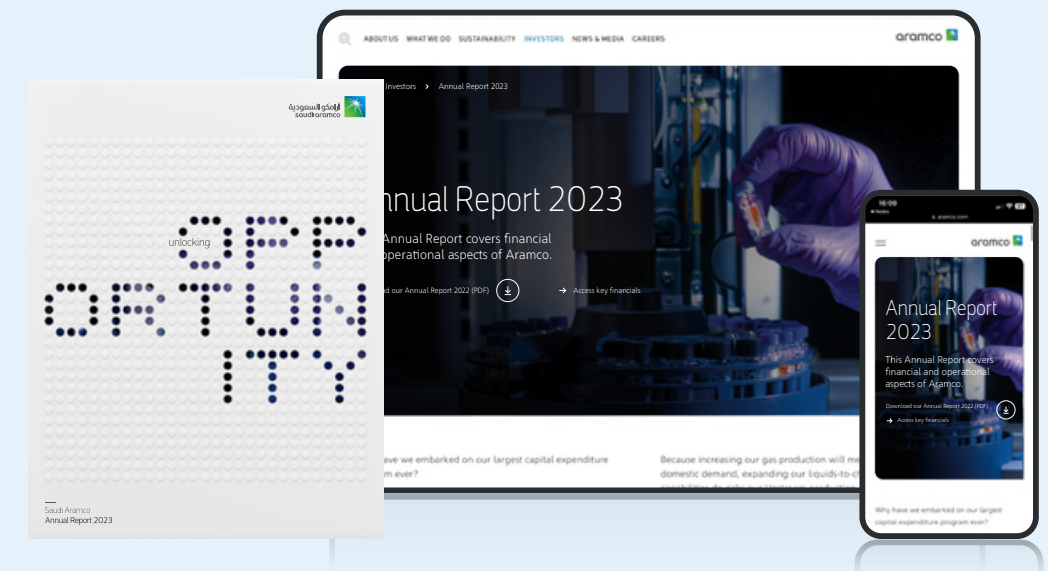
- risks related to operating in a regulated industry and changes to oil, gas, environmental, health, safety or other regulations that impact the industries in which Aramco operates;
- Legal proceedings, international trade matters, and other disputes or agreements; and
- Other risks set forth in our 2023 Annual Report available on our website.

In light of these risks, uncertainties and assumptions, the forward-looking statements described in this Report may not occur in the manner described or may not occur at all. These forward-looking statements speak only as of the date of this Report. We undertake no obligation to update or revise any forward-looking statement, whether as a result of new information, future events or otherwise. All subsequent written and oral forward-looking statements attributable to us or to persons acting on our behalf are expressly qualified in their entirety by the cautionary statements referred to above and contained elsewhere in this Report. Undue reliance should not be placed on the forward-looking statements.

Except where noted, the information covered in this Report highlights the company's performance and initiatives in fiscal year 2023. The inclusion of information in this Report should not be construed as a characterization regarding the materiality or financial impact (or potential impact) of that information. Sections of this Report have been prepared with reference to and guidance from various reporting frameworks, standards and guidelines, as outlined at the start of this Report. The Company's application of the various frameworks, standards and guidelines is based on its interpretation and judgment.

This Report may contain references to links to or information from other internet sites. Such links and information are not endorsements of any products or services in such sites, are not being incorporated by reference herein, and no information in such sites has been endorsed or approved by Aramco.

This document should be read together with Aramco's public reporting, including our Annual Report, our website, and our policies.



■ Please see our 2023 Annual Report at www.aramco.com/en/investors/annual-report

■ Please visit www.aramco.com for more information

■ Please visit www.aramco.com/sustainability for more information on our approach to sustainability, our basis of preparation and our independent assurance statements for 2019, 2020, 2021, 2022, and 2023

Contact us

We hope you find this Report engaging and informative, and we continue to welcome your input and views:

 sustainability@aramco.com

Social media

We are also active on the below social media platforms, so please follow us to learn more about Aramco and our sustainability journey:

 [@aramco](https://twitter.com/aramco)

 [linkedin.com/company/aramco](https://www.linkedin.com/company/aramco)