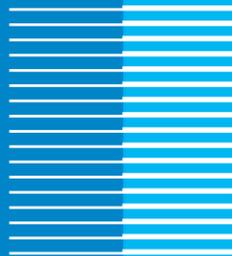


KAFD Dialogue Report

Sustainability,
Climate Change
and the Journey of
Saudi Arabia

Sustainability, Climate Change and the Journey of Saudi Arabia

11 October 2023



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Introduction

The King Abdullah Financial District (KAFD) Dialogues are a private quarterly dinner series that drive forward global discussions on critical challenges facing businesses and their leaders today. The mission of the KAFD Dialogues is to promote frank and candid discussion between international and Saudi business leaders, creating knowledge and understanding of how to navigate emerging opportunities and obstacles within the global business landscape.

The fifth KAFD dialogue took place on October 11, 2023, coinciding with Middle East Climate Week, and focused on: Sustainability, Climate Change and the Journey of Saudi Arabia. To discuss this topic, KAFD invited Matthew Bateson, Chief Climate Change and Sustainability Officer, Saudi Aramco; Zoe Knight, Group Head, Centre of Sustainable Finance and Head of Climate Change MENAT, HSBC; Dr. Malek Al-Chalabi, Senior Carbon Pricing Policy Advisor, Shell; Abdulelah Al Sheikh, Country Director, Saudi Arabia, Jacobs; and Sami Amin, Senior Operations Director, Careem to participate in an off-the-record discussion moderated by Asia House Chief Executive Michael Lawrence OBE. This dialogue was attended by CEOs and senior executives from around 70 leading Saudi and international businesses.

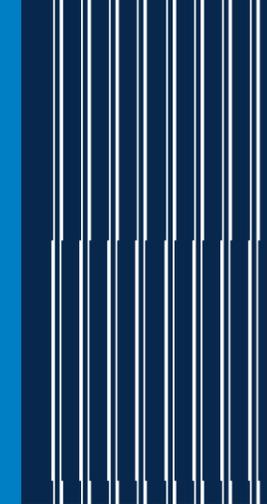
While all discussions at the KAFD Dialogues are kept strictly off-the-record to promote a highly useful and frank exchange of views, this Dialogue Report examines the key themes covered in the dialogue and provides focused analysis intended to enhance knowledge and understanding of the topics for the business community in Saudi Arabia and at the international level. This report looks in depth at the context in which the dialogue was held, including current global trends in sustainability and green finance, as well as recent initiatives by Saudi Arabia to enhance its environmental sustainability and work towards its climate goals.





Unveiling the Climate Challenge: Navigating Saudi Arabia's Future

Key Findings of
the Dialogue



Dive into the pressing reality of climate change in Saudi Arabia



Dive into the pressing reality of climate change in Saudi Arabia – a tale that goes beyond global warming statistics and resonates deeply with the Kingdom’s habitat and economic stability. Picture a Saudi Arabia grappling with intensified heatwaves, atmospheric pollution, shrinking water resources, and catastrophic floods. The stakes are high, impacting not only the daily lives of its residents but also jeopardizing the ambitious goals outlined in Vision 2030, from enhancing livelihoods to transforming the nation into a global tourist hotspot.

For decades, Saudi Arabia has been an energy titan, fueling global economic growth through its oil revenue. This seismic shift towards a greener fuel underscores the urgent need for economic diversification, renewable technology advancement, and a radical transformation of the oil and gas sector. Enter Carbon Capture Utilization & Storage (CCUS) technologies, the adoption of alternative fuel sources like Hydrogen and Ammonia – strategies that not only reduce carbon emissions but also position Saudi Arabia as a player in the global energy transition. The Kingdom stands at the cusp of an unprecedented opportunity, where combating climate change aligns seamlessly with sustainable economic growth.

1 The Impact of Climate Change on Saudi Arabia: Why the Global Energy Transition is important

	<p>Transition from Oil Dependency</p> <p>Saudi Arabia, a historical energy titan, recognizes the urgent need for economic diversification.</p>		<p>Carbon Capture and Alternative Fuels</p> <p>Adoption of Carbon Capture Utilization & Storage (CCUS) technologies is a key strategy.</p>
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The Kingdom is on a trajectory to achieve net-zero by 2060 and secure 50% of its energy from renewables by 2030

Saudi Arabia isn’t merely adapting; it’s taking the lead in steering the Gulf region towards a sustainable energy future. The Kingdom is on a trajectory to achieve net-zero by 2060 and secure 50% of its energy from renewables by 2030. The financial commitment is staggering – over US \$186 billion earmarked to green the economy. To secure this investment, Saudi Arabia is laying the groundwork for a robust domestic sustainable finance market, accompanied by stringent regulations and financing programs to enhance ESG reporting among its companies.

Saudi Arabia extends its influence through the Middle East Green Initiative

Saudi Arabia extends its influence through the Middle East Green Initiative (MGI). This visionary project aims to slash CO₂ emissions by a staggering 670 million tons, plant 50 billion trees across the region, and restore 200 million hectares of degraded land.¹ The Kingdom isn’t just adapting to climate change; it’s championing a paradigm shift, beckoning the entire Middle East towards a more environmentally sustainable future.

2 Unleashing Saudi Arabia's Oil Revolution: Pioneering the Energy Transition

Saudi Arabia's oil sector is adapting to the energy transition amid growing calls from international policymakers and business leaders. The Kingdom is studying how to transform its oil industry so that it can continue to meet the world's energy demands, but in a more environmentally sustainable way. Oil remains Saudi Arabia's largest source of revenue, reaching US \$326 billion in 2022 and contributing to approximately 40% of the Kingdom's GDP.² Investments in CCUS as well as blue hydrogen plants offer pathways to decarbonize the oil and gas industry.

The Potential of CCUS

Saudi Aramco has been at the forefront of CCUS adoption in the Kingdom. One project sees the capturing and processing of 45 million cubic feet of CO₂ emissions at Saudi Aramco's Hawiyah Gas Plant. The gas can then be piped into the Uthmaniyah oil reservoir to sequester CO₂ whilst recovering more oil.³ Saudi Aramco has also partnered with American oilfield company Schlumberger, and German chemical company Linde, to build one of the world's largest CCUS hubs in the Jubail industrial zone.⁴ Starting in 2027, 9 million metric tons of CO₂ will be collected per year, with the aim of capturing 44 million metric tons by 2035. Saudi Arabia currently emits around 608 million metric tons annually. Saudi Aramco has pioneered other CCUS applications. For example, it can use stored carbon to create plastics with just one-third of the carbon footprint

of traditional plastic production. In addition, Saudi Aramco has also created a technology that uses CO₂ rather than air to cure concrete, with the material absorbing 20% of the gas.⁵

Saudi Arabian firms, universities, and research institutes are also studying CCUS, and circular carbon economy approaches to climate change. Saudi industrial chemicals producer, SABIC for example, is researching how captured CO₂ can be used as a feedstock to produce chemicals such as methanol and urea. In 2019, SABIC also launched a polycarbonate that has a 50% lower carbon footprint compared to fossil fuel-based polycarbonate production.⁶ Researchers at the King Abdullah University of Science and Technology (KAUST) are also exploring how metal-organic frameworks can capture CO₂ more efficiently than conventional methods, catalyzing the gas's transformation into carbon

monoxide, a valuable chemical feedstock. They are currently looking into various metal combinations in their research.⁷

CCUS development has gained significant momentum in recent years, driven by strengthened climate targets and subsequently increased policy support for the technology globally. In 2022, 61 new CCUS facilities were added to the global project pipeline, bringing the global total number of CCUS projects to 30 in operation, 11 under construction, and 153 in development. Nevertheless, there are doubts about the maturity of the technology and how effectively it can reduce greenhouse gas emissions, with some advocating that CCUS should be used to complement rather than replace wider action on carbon mitigation, or alternatively that it distracts from implementing the decommissioning of the oil and gas industry entirely.

Reconfiguring the Oil and Gas Industry: The promise of Hydrogen

But the narrative doesn't end with CCUS. Saudi Arabia is carving its destiny with hydrogen—both blue and green. To reconfigure its oil and gas industry, Saudi Arabia has increased investment and research into the development of green and blue hydrogen as alternative fuels. Blue hydrogen is a low carbon fuel created from natural gas. It is used to produce blue ammonia, a product from the combination of ammonia synthesis with hydrogen CCUS technologies.⁸ Green hydrogen, on the other hand, is produced by the electrolysis of water using renewable energy derived from solar and wind power. Saudi Arabia has great potential to scale up green hydrogen production, due to the country's vast areas of flat, cheap, and sun-exposed land, although it is currently more expensive to produce than blue hydrogen due to the high cost of electrolyzers.

Saudi Arabia is seeking to become the world's largest hydrogen supplier, with targets of producing 2.9 million tons per year by 2030 and 4 million tons per year by 2035. This will assist the Kingdom's economic diversification away from oil and assist the resilience of its oil and gas industry through the production of ammonia, as countries looking to

decarbonize seek alternative fuels to oil and its refined products.⁹ Most notable is the partnership between Neom Green Hydrogen Company and Saudi Arabia's Industrial Development Fund (SIDF) to build the world's largest production facility in Neom. Green hydrogen produced from 4GW of solar and wind power will be used to manufacture green ammonia, which will be used as a fuel and exported. As a result, 1.2 million tons of green ammonia are expected to be produced per year once the plant starts operating in 2026.



3 Beyond Oil and Gas: How is Saudi Arabia enhancing its environmental sustainability?

Step into the dynamic realm where Saudi Arabia is shedding its oil-centric identity, embracing a future rooted in environmental sustainability. Energy efficiency is being increasingly prioritized with efforts such as the Mostadam Building Rating System encouraging green buildings, as well as a growing focus on electric vehicle (EV) adoption. The Kingdom is not just adapting; it's orchestrating a symphony of strategies spanning carbon neutrality, renewable energy, energy efficiency, and a greener landscape through afforestation.

The Kingdom's Climate Odyssey

Saudi Arabia, once synonymous with oil wealth, is now at the forefront of a green revolution. Crown Prince Mohammed bin Salman's vision is clear – achieve net-zero by 2060. This ambitious goal marks a pivotal shift with the Public Investment Fund (PIF) joining the movement and aiming for net-zero by 2050 through investments in renewables, energy efficiency, and emission-reducing technologies.

In 2021, the Saudi Green Initiative (SGI) emerged as the nation's beacon in the fight against climate change. Designed to enhance quality of life, protect the environment, and spearhead the transition to a green economy, the SGI catalyzes investments in emissions reduction, afforestation, and land and sea protection. Not stopping at national borders, the Middle East Green Initiative (MGI), launched in the same year, propels Saudi Arabia's regional leadership in tackling climate change and aligning with global targets.



Renewable Projects

Saudi Arabia's commitment to renewables is not mere rhetoric. The National Renewable Energy Program is driving sustained oil production while embracing clean energy. The Saudi Arabian private utility developer ACWA Power aims to sustainably produce 11.8 GW of electricity by 2025 through the three solar power plants it owns with the PIF's subsidiary Badeel. These include Ar Rass 2, Saad 2 and Al Kahfah, which have received a total investment of US \$2.37 billion.¹⁰ In fact, September 2022 witnessed the launch of five projects producing 3.3 GW of renewable energy. These include three wind farms in Yanbu, Al-Ghat and Waad Al Shamal, with a total production capacity of 1.8 GW, as well as two solar plants in Al Hinakiyah and Tabarjal with a capacity of 1.5 GW. These projects will provide enough power for 750,000 Saudi households and significantly contribute to the Kingdom's goal of having renewables account for 50% of its energy production by 2030.

There are also various partnerships between Saudi Arabian and international companies to advance renewable energy production. For example, in January 2023, Chinese clean energy company Jinko Solar started the construction of its Saad Solar plant that will power 132,000 homes in the Kingdom.¹¹ Similarly, Saudi Arabian solar and infrastructure holding company, Desert Technologies, partnered with the Indian conglomerate, Essar Group, in September 2022 to develop renewable energy solutions for Essar's Green Steel Arabia project in the Kingdom. It positions Saudi Arabia as a leader in green steel production and renewable energy, underscoring its commitment to reducing its greenhouse gas emissions. The project is also planning a US \$4.5 billion investment for an integrated steel plant in Ras Al Khair, establishing itself as the region's first green steel project.¹²

Enhancing Domestic Energy Efficiency

Saudi Arabia, known for burning oil to power its grid, is rewriting the narrative through aggressive energy efficiency initiatives. Fuel subsidies totaling a staggering US \$7,000 per person per year are an inefficiency ripe for transformation.¹³

This is an inefficient way to power the grid, providing the Kingdom the opportunity to enhance energy efficiency to reduce domestic oil consumption by two million barrels per day by 2030 through various initiatives. The Kingdom's implementation of energy efficiency standards is developing, focusing primarily on the building sector that accounts for 29% of the nation's energy consumption. For example, the Saudi Building Code enacted a regulation in 2019 that makes the insulation of new buildings mandatory. The Saudi Energy Efficiency Centre, which guides regulations of all governmental, commercial, and residential buildings set the insulation standards.

Saudi Arabia has also adopted its own Building Rating System named Mostadam.¹⁴ Mostadam was established to align with prevailing legislation, such as the internationally recognized LEED certification, whilst accommodating for Saudi Arabia's local climate and environmental characteristics. It extends its influence to projects like the King Salman Energy Park, showcasing a gold certification.

Similarly, boasting the Kingdom's first LEED ND Stage 2 Platinum certification for the entire district, KAFD's buildings are connected via smart building management solutions such as fire alarm, energy control and data collection systems.¹⁵ More recently, KAFD has partnered with Google to help residents and visitors navigate the district more efficiently with complementing initiatives to employ shuttle buses and smart scooters to reduce carbon emissions.¹⁶

The Kingdom is racing toward electric mobility, with Ceer and Lucid Group leading the charge. Lucid's first overseas production plant in Jeddah promises up to 100,000 electric vehicles (EVs) within a decade, a testament to PIF's US \$1.8 billion investment. The Electric Vehicle Infrastructure Development Initiative, launched in 2021, aims for 50,000 charging stations by 2025.¹⁷ Electromin's 700 charging sites and Siemens' partnership are pivotal steps in advancing EV infrastructure technology.

Likewise in October 2023, PIF and Saudi Electric Company launched an EV infrastructure company that aims to build 5,000 EV chargers in more than 1,000 locations across the Kingdom.¹⁸ These initiatives demonstrate Saudi Arabia's progress in enhancing the transportation sector's energy efficiency and meeting national climate targets.



Afforestation: Greening the Desert

Against the backdrop of arid landscapes, Saudi Arabia's tree-planting program, initiated by Crown Prince Mohammed bin Salman, aims to plant ten million trees in the next few decades to increase the area of Saudi land covered with trees by twelvefold,¹⁹ thereby fostering environmental awareness and creating employment opportunities. The Saudi Green and Middle East Green initiatives, launched in 2022, aspire to plant a staggering 50 billion trees, reducing carbon emissions by over 10%.²⁰

Saudi Arabia's environmental odyssey is a tapestry of ambition, collaboration, and innovation. Beyond oil and gas, the Kingdom is carving a sustainable path, inviting the world to witness its transformative journey toward a greener, cleaner future.

4 Funding the Kingdom's Energy Transition: The importance of green finance



Green finance refers to the financing of investments, projects, and initiatives that have positive environmental benefits. It aims to support the transition to a more sustainable, low-carbon economy by directing capital towards environmentally sustainable ventures such as renewable energy, energy efficiency, and pollution reduction projects. The scale of green finance required for countries to transition to net-zero is considerable. The Glasgow Financial Alliance for Net Zero (GFANZ) estimates that between US \$100-150 trillion is needed to prevent a 1.5 degree rise in global temperatures, highlighting the scale of the challenge.

Saudi Arabia is exploring green finance mechanisms as a means of funding its energy transition. The emerging sector can help the Kingdom achieve its aims of diversifying its sources of revenue under Saudi Vision 2030, whilst mitigating its sustained oil production and export to achieve its net-zero targets. PIF established its green finance framework in early 2022, selling a debut US \$3 billion green

bond in September of 2022 that was eight times oversubscribed, and a second one in February 2023 which raised US \$5.5 billion and was more than six times oversubscribed. It is the world's first sovereign wealth fund to do so, and the proceeds will be used to finance green investments. Saudi companies are yet to issue sustainable bonds, although the PIF has made an important stepping stone.

Saudi lenders such as Saudi National Bank (SNB) and Riyadh Bank have also contributed to finance sustainable projects across the Kingdom. SNB was the first bank in the Kingdom to create its Sustainable Finance Framework in November 2021 that permits it to issue green and social bonds or loans. Riyadh Bank followed suit in February 2022. These banks, alongside SAB, Alinma Bank, and Banque Saudi Fransi, have also provided approximately US \$3.5 billion to finance NEOM's green hydrogen plant.²¹ Such initiatives demonstrate that Saudi banks are increasing their commitment to green financing initiatives, yet they are still in their early development.

5 Saudi Arabia's potential to develop a Carbon Market



Carbon markets are a forum in which countries and companies can purchase and sell carbon emission allowances. They operate based on cap-and-trade systems, and entities that emit less than their allotted quota can sell their excess allowances to entities that exceed theirs. They are useful for decarbonization efforts because at scale they can prevent an overall increase in greenhouse gas emissions and economically incentivize companies to reduce their emissions.

Saudi Arabia is exploring the potential applications of carbon markets in its efforts to achieve sustainable economic growth. In 2022, the PIF and Saudi Stock Exchange Tadawul established the Regional Voluntary Carbon Market Company (RVCMC) in Riyadh to create carbon offsets and credits in the MENA region.²² It plans to become one of the world's largest carbon markets by 2030 to help businesses and industries in the region achieve their transition to net-zero and support a low-carbon global economy.

In June 2023, the RVCMC's second auction took place in Nairobi and sold more than 2.2 million tons of carbon credits, the largest ever voluntary carbon credit auction.²³ Saudi Arabian and international firms took part in the auction, with Saudi Aramco, the Saudi Electricity Company, and ENOWA purchasing the highest number of carbon credits.²⁴ In October this year, during the UN's MENA Climate week in Riyadh – the same week as the KAFD Dialogue - Saudi Arabia initiated its Greenhouse Gas Crediting and Offsetting Mechanism (GCOM). It is a domestic market mechanism that aims to help the Kingdom achieve its climate goals and help companies reduce their emissions by purchasing Saudi carbon credits.²⁵

At a global level, carbon markets continue to develop. The EU's Emissions Trading System established in 2005 is the largest carbon market in the world and covers 45% of the region's greenhouse gas emissions. More recently, the Carbon Border Adjustment Mechanism (CBAM) entered its transitional phase on October 1, 2023. Its purpose is to equalize carbon prices between domestic products and imports, ensuring that the EU's environmental strategies are not undermined by businesses moving to nations with weaker environmental guidelines or substituting EU products with those that have higher carbon footprints. This signifies an industrial shift towards more sustainable and cleaner production; however, EU businesses have expressed concern over the mechanism's impact on global supply chains as it may increase trading, manufacturing, and administrative costs. Non-EU producers will also find it more expensive to export to the EU, making them less competitive in the EU market.

As decarbonization gains increased importance on national agendas, carbon markets may develop by expanding into new regions and widen their sector coverage to transportation and agriculture, rather than solely power. Higher carbon prices can incentivize decarbonization, and markets can integrate more nature-based solutions into their functionality. For example, an area for future development of Saudi Arabia's Carbon Market may be by linking it with the Kingdom's afforestation initiatives under Saudi Vision 2030 and the Saudi Green Initiative. This could allow for the creation of carbon credits that can be purchased by companies to offset their carbon emissions, maintaining Saudi Arabia's economic growth. This would particularly help oil and gas companies sustain their production and exports.

6 The status of ESG reporting in the Kingdom

In the realm of corporate transparency, Environmental, Social, and Governance (ESG) reporting has emerged as a beacon, shedding light on a company's commitment to sustainable practices. This disclosure not only serves investors and customers but also fuels the global drive toward decarbonization. Saudi Arabia, recognizing the pivotal role of ESG reporting, is championing this cause with strategic initiatives and regulatory mandates.

The Tadawul, Saudi Arabia's stock exchange, took a groundbreaking step in 2021 by unveiling mandatory sustainability disclosure guidelines for listed companies. This move aimed to propel ESG reporting within the domestic market, urging companies to elevate their non-financial performance. Aligned with the United Nations Sustainable Stock Exchanges model, these guidelines act as a catalyst for heightened ESG awareness.

The Kingdom's Capital Market Authority (CMA) complemented this effort by implementing corporate governance regulations, addressing critical ESG issues such as conflicts of interest, board responsibilities, internal audits, and social responsibility initiatives.

Publicly listed companies are now obligated to publish comprehensive non-financial ESG reports, fostering a culture of transparency and accountability.

In a bold stride toward progress, the CMA introduced the Corporate Governance Code in 2023, setting robust standards for board directors, disclosure requirements, and shareholder rights. This multifaceted approach not only attracts foreign investment but also safeguards the interests of investors, creating a resilient financial ecosystem.

In the landscape of ESG reporting, Saudi Arabia outshines its GCC counterparts, spearheading initiatives that echo its commitment to sustainability. As the Kingdom's capital markets witness exponential growth—18 companies listed in 2022 with an additional 24 expected by the end of 2023—the impetus for enhanced sustainability reporting intensifies, fueled by mandatory ESG reporting requirements. Despite these strides, challenges persist, particularly in the absence of standardized regional and international ESG frameworks. To bridge this gap, PwC's 2023 Middle East ESG Report highlights the need for global collaboration. With COP28 in Dubai this November, a platform for business and political leaders to forge standardized ESG reporting frameworks may emerge, dismantling barriers and propelling the Kingdom and the world toward a sustainable future.



7 What can Saudi and global businesses do to transition to net-zero?

As Saudi Arabia charts its course toward a decarbonized economy, its diverse businesses are compelled to amplify their commitment to sustainability, essential for securing talent, customers, and financial backing. The journey to net-zero not only aligns with Saudi Arabia's ambitions but also promises substantial benefits on a global scale, positioning early adopters at the forefront of a competitive advantage.

Swift transitions to net-zero can yield financial backing and garner a larger share of the environmentally-conscious consumer base. Beyond immediate advantages, long-term cost savings beckon as companies sidestep potential carbon taxes and penalties, ensuring resilience in the face of evolving regulatory landscapes and securing a spot in sustainable supply chains. Net-zero commitments also cultivate positive investor relations, especially resonating with environmentally conscious shareholders.

For both Saudi and global businesses, embracing net-zero necessitates proactive initiatives. Adaptable to evolving ESG reporting standards, companies ensure accurate communication of ESG information, empowering them to formulate informed investment strategies in alignment with prospective investors. This adaptability also aids in identifying and rectifying poor ESG performers within intricate supply chains.

Technological integration stands as the cornerstone for this transition, encompassing investments in new infrastructure and energy-efficient equipment. Initiatives span from the utilization of renewable energy to power facilities to the implementation of digitalization for heightened operational efficiency. Additive manufacturing emerges as a transformative force, streamlining supply chains and curbing carbon emissions related to the transportation of essential components. The amalgamation of IoT-driven energy monitoring and AI facilitates real-time data analysis, ensuring ESG adherence and prompt decision-making on carbon credit purchases. Automation dovetails with AI, expediting the execution of eco-friendly decisions across production and transportation. In the oil sector, the imperative lies in adopting Carbon Capture, Utilization, and Storage (CCUS) technologies,

maintaining the relevance of hydrocarbons in the global energy landscape while mitigating their environmental impact.

However, amidst these clear pathways to net-zero, challenges loom large. The lack of standardized international ESG reporting, limited technology for carbon emissions measurement, and the scarcity of affordable green finance create obstacles in the global energy transition. Governments' data localization policies impede the seamless cross-border exchange of crucial emission data. Despite their immense potential, many of these technologies remain in developmental stages, underscoring the need for collaborative efforts to propel them into mainstream adoption. As Saudi businesses navigate this complex landscape, the imperative is not just transition but leadership in crafting a sustainable future.



8 The Future of Saudi Arabia's Environmental Sustainability Strategy

Saudi Arabia's ambitious climate targets demand an expansion of its environmental sustainability strategy. Despite various initiatives in the planning and initiation phases, such as developing a carbon market, scaling up green finance, and enhancing domestic energy efficiency, the Kingdom now faces the crucial task of implementing these policy changes to meet its climate goals. While keen on sustaining oil production and exports to avoid stranded assets, Saudi Arabia plans to collaborate with international companies to procure alternative hydrogen fuels and integrate CCUS technologies in oil production processes, particularly in sectors heavily reliant on hydrocarbon-based fuels.

COP28 and Saudi Arabia's role

In the reconfiguration of its oil and gas sector, Saudi Arabia aims to showcase that CCUS, hydrogen, green finance, and afforestation can offset the environmental impacts of continuous oil production. This strategic move aligns the Kingdom with global trends toward achieving net-zero while safeguarding the significance of its oil sector. Recognizing the oil sector's crucial role in international energy security and its dominance in Saudi Arabia's international trade, the Kingdom advocates for a strategic revamp of the industry rather than a complete overhaul, presenting it as the most pragmatic choice.

As COP28 approaches, Saudi Arabia plans to leverage its expertise and position as one of the world's largest oil producers. The goal is to assert that achieving net-zero is possible while maintaining oil production and export levels. This position was well demonstrated during the gathering of three energy ministers from Saudi Arabia, the UAE, and Iraq on October 8 in Riyadh during Middle East Climate Week, where they expressed that COP28 will be more inclusive of the oil and gas industry and promote discussion regarding its role in decarbonization initiatives.²⁶ Saudi Arabia will also likely use COP28 to offer solutions to other energy producers who face similar challenges in diversifying away from oil.



Implementation Challenge

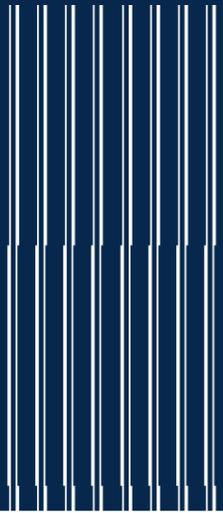


Collaboration for Sustainable Energy Transition





CASE STUDY



KAFD: A commitment to the environment and sustainability

Urban growth puts cities under immense pressure – socially, economically, and environmentally, immensely contributing to urban sprawl, high energy consumption, increased water usage, infrastructure bottlenecks, congestion, and resource-intensive lifestyles. With nearly 80% of the world's population projected to live in urban areas by 2050, cities are becoming major contributors to global energy consumption and greenhouse gas emissions, often accounting for 60-80% of energy use and 70% of human-induced emissions.

Sustainability – it's in everything KAFD does. The district takes Saudi Arabia's challenging climate into account, starting with the master plan's initial design. KAFD's central Wadi, designed to resemble the desert valleys of the region, is a pedestrian zone connecting all areas of the district. Notably, it's constructed 5.5 meters below street level, ensuring that the Wadi's temperature remains consistently 8-10 degrees lower than the central Riyadh temperature. At a more passive level, the masterplan arranges buildings around an urban wadi, channeling winds and creating moments of shade and climate comfort within landscape pockets and microclimates.

This is supplemented by continuous innovation in city operations and maintenance that's evident in buildings designed with large, shaded areas, courtyards, or using energy-efficient cooling systems as well as the use of eco-friendly coating solutions to help minimize heat flow. KAFD is exploring the use of Solar Heat Reflective coatings on building surfaces and roads enabling a lower-carbon lifestyle and reflecting



KAFD's commitment to sustainable solutions and combating climate change. Recently, the district signed an agreement with the Japanese conglomerate, Sumitomo, to implement their eco-friendly coating solutions in KAFD, which will reduce the cooling load and costs of air conditioning, reduce the surface temperature and reflect infrared radiation, as well as mitigate the heat island effect.

Today, KAFD's buildings are notably 10% to 15% more energy-efficient than conventional structures. The district is also exploring water recycling opportunities and integrating water-efficient products and fittings that are set to reduce building water demand per capita by 20% and achieve 20-30% greater water efficiency in KAFD buildings compared to conventional structures. According to the UN-Habitat, as urbanization and population growth continue, it is expected that municipal solid waste generation will double by 2025. In that context, KAFD introduced an automated waste management system, a clean and environmentally friendly waste management system that uses air to efficiently remove waste from buildings in the district.

This essentially extends to KAFD's mobility strategy, which prioritizes convenience and environmental impact. Over 40 sky bridges and a monorail will connect the entire district, ensuring that everything is within a 10-minute walk in a climate-controlled environment. From electric scooters to a ridesharing mobility solution, KAFD city navigation solutions are cleaner, smarter, and more sustainable than traditional transportation.

As a result, KAFD is the largest mixed-use business district globally to receive the prestigious Leadership in Energy and Environmental Design (LEED) ND Stage 2 Platinum certification from the U.S. Green Building Council, underlining KAFD's dedication to environmentally friendly practices.

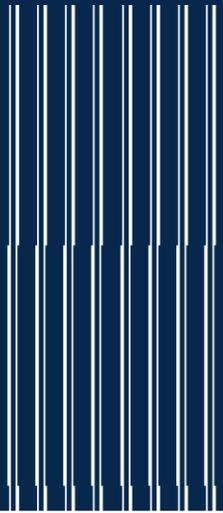
Moreover, over 40 buildings in the district have achieved Silver and Gold LEED certifications, emphasizing KAFD's relentless green efforts. All buildings incorporate advanced insulation and glazing techniques that optimize temperature control.

At the same time, KAFD is actively contributing to Saudi Arabia's green initiatives by planting numerous trees, shrubs, and ground-cover plants, creating lush green spaces. In 2022 alone, around 400 palm trees have been planted, 3,476 canopy trees, over 130,000 shrubs, and more than 220,000 ground-cover plants. KAFD's parks are adorned with over 4,000 sqm of lawns, aligning with Saudi Arabia's ambitious reforestation plans and broader environmental goals.





CONCLUSION





Why the Global Energy Transition is Important

The KAFD Dialogue underscored the critical and urgent need for Saudi Arabia to address the impact of climate change on its habitat and economic stability.



ECONOMIC DIVERSIFICATION IS IMPERATIVE

With the decline in oil revenues expected due to global decarbonization efforts, this report highlights the crucial role of economic diversification. Saudi Arabia needs to invest in renewable technologies, such as Carbon Capture Utilization & Storage (CCUS), and reconfigure its oil and gas sector to contribute to the global energy transition.



LEADERSHIP IN CLIMATE INITIATIVES

Saudi Arabia is positioned as a leader in climate-related efforts within the Gulf region. Ambitious targets, such as becoming net-zero by 2060 and achieving 50% domestic energy supply through renewables by 2030, demonstrate the Kingdom's commitment. Initiatives like the Middle East Green Initiative (MGI) further emphasize Saudi Arabia's role in steering the region towards environmental sustainability.



CCUS MOMENTUM AND INNOVATION

This report highlights the momentum in CCUS development, showcasing Saudi Aramco's leadership in implementing CCUS technologies. Innovative applications, such as using stored carbon for plastic production, demonstrate the potential of CCUS in reducing carbon emissions associated with the oil and gas industry.



GREEN FINANCE AS A CATALYST

This report emphasizes the importance of green finance in funding Saudi Arabia's energy transition. The oversubscription of PIF's green bonds demonstrates the global interest and confidence in the Kingdom's commitment to sustainable investments.



HYDROGEN AS A KEY PLAYER

Recognizing the potential of hydrogen as an alternative fuel, this report explores Saudi Arabia's efforts to become a major hydrogen supplier. Investments in green and blue hydrogen production, particularly the Neom Green Hydrogen Company's partnership for a massive green ammonia production facility, signify a commitment to sustainable economic growth.



AFFORESTATION FOR ENVIRONMENTAL PRESERVATION

Saudi Arabia's afforestation efforts, including the ambitious goal of planting 50 billion trees, are acknowledged for their potential to sequester carbon, combat desertification, and enhance biodiversity.



CARBON MARKETS AND ESG REPORTING

Similarly, the exploration of carbon markets, exemplified by the creation of The Regional Voluntary Carbon Market Company, and the Kingdom's efforts in ESG reporting indicate Saudi Arabia's proactive stance in aligning with global standards for sustainable practices.



ROLE IN COP28

As COP28 approaches, this report anticipates Saudi Arabia leveraging its expertise in oil production to advocate for a strategic reconfiguration of the oil and gas industry. The Kingdom aims to demonstrate that net-zero can be achieved while maintaining oil production and will likely offer solutions to other energy producers facing similar challenges. This report concludes with optimism about Saudi Arabia's potential to play a pivotal role in shaping the global energy landscape.



RENEWABLE ENERGY PROJECTS

The Kingdom's investments in various renewable projects, including solar and wind farms, demonstrate a commitment to balancing sustained oil production. Collaborations with international companies further position Saudi Arabia as a leader in green steel production and renewable energy.



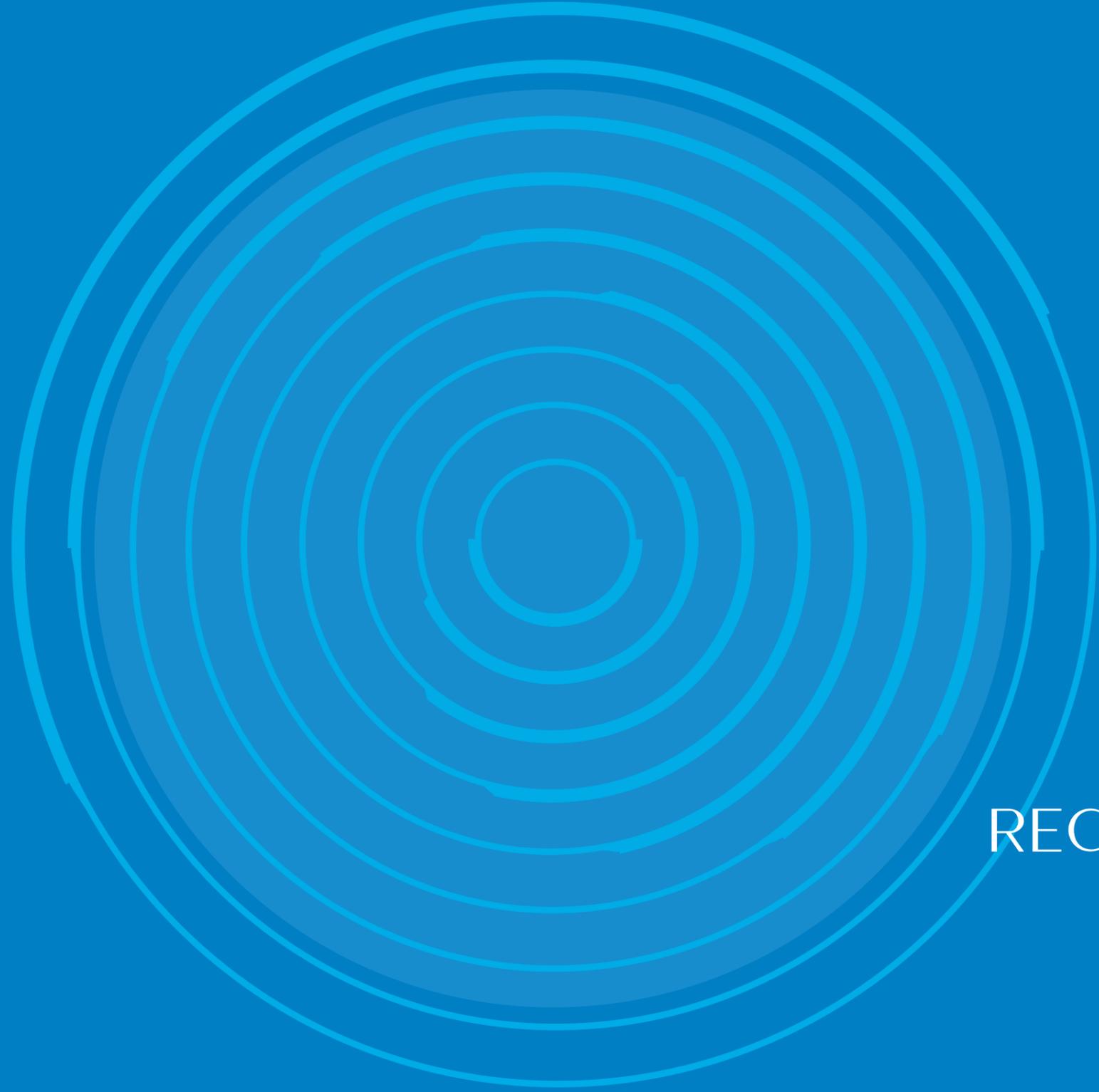
ENERGY EFFICIENCY INITIATIVES

This report applauds Saudi Arabia's efforts to enhance energy efficiency, citing initiatives such as the Mostadam Building Rating System and the promotion of electric vehicles. In addition, the strategic location of the Lucid Group's overseas production plant in Jeddah highlights the Kingdom's efforts to contribute to international decarbonization.

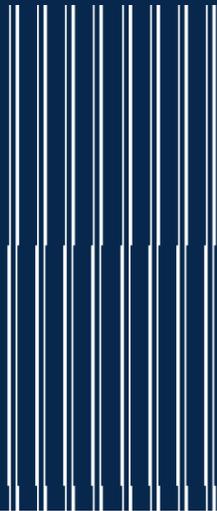


CHALLENGES AND OPPORTUNITIES

While acknowledging the challenges such as the absence of international ESG reporting standardization and technological limitations, this report encourages businesses to seize the opportunities presented by the global energy transition. Early adoption, innovation, and adherence to evolving guidelines can provide a competitive advantage and ensure long-term sustainability.



RECOMMENDATIONS





INVEST IN RENEWABLE TECHNOLOGIES

Given the potential decline in oil revenues, Saudi Arabia should accelerate investments in renewable energy sources, such as solar and wind power, to diversify its energy mix and meet its target of 50% domestic energy supply from renewables by 2030.

PRIORITIZE CARBON CAPTURE UTILIZATION & STORAGE (CCUS)

Continue and expand efforts in the development and implementation of CCUS technologies, as they play a crucial role in reducing carbon emissions from the oil and gas industry.

PROMOTE HYDROGEN PRODUCTION

Further research and investment in both green and blue hydrogen production can contribute to the energy transition. Green hydrogen, produced through electrolysis with renewable energy, should be explored given Saudi Arabia's vast areas of flat, sun-exposed land.

ENCOURAGE SUSTAINABLE FINANCE

Strengthen regulations and financing programs to develop a robust domestic sustainable finance market. Saudi Arabian companies should actively engage in ESG reporting to attract green investments.

SUPPORT CIRCULAR CARBON ECONOMY INITIATIVES

Continue research and development in circular carbon economy approaches, such as SABIC's efforts to use captured CO₂ as a feedstock for chemical production, contributing to a more sustainable industrial sector.

AFFORESTATION AND BIODIVERSITY CONSERVATION

Strengthen efforts in afforestation to combat desertification, enhance biodiversity, and sequester carbon. Collaborate with international partners to support large-scale afforestation initiatives.

ENHANCE ENERGY EFFICIENCY

Implement and enforce energy efficiency standards, particularly in the building sector. Continue initiatives like the Mostadam Building Rating System to encourage green construction and sustainable practices.

EXPLORE GREEN FINANCE MECHANISMS

Continue exploring and expanding green finance mechanisms to fund sustainable projects. Companies, especially in the energy sector, should consider issuing sustainable bonds to attract green investments.

PROMOTE STANDARDIZED ESG REPORTING

Advocate for standardized ESG reporting at global forums like COP28 to provide clarity and consistency in assessing corporate sustainability performance.

COLLABORATE WITH INTERNATIONAL PARTNERS

Collaborate with international companies, research institutions, and governments to share knowledge, technology, and best practices in achieving climate goals. Foster partnerships that support the development and implementation of sustainable solutions.

ACCELERATE ELECTRIC VEHICLE (EV) ADOPTION

Invest in EV infrastructure and promote the adoption of electric vehicles to reduce dependence on fossil fuels in the transportation sector. Continue partnerships with international companies to advance EV technology.

DEVELOP A CARBON MARKET

Actively participate in the development of a regional and global carbon market. Saudi Arabia can leverage its carbon market initiatives, such as the Regional Voluntary Carbon Market Company, to support businesses in transitioning to net-zero.

ENGAGE IN COP28 DISCUSSIONS

Use the opportunity of COP28 to showcase Saudi Arabia's commitment to net-zero while maintaining its oil production. Advocate for inclusive discussions that recognize the role of the oil and gas industry in the global energy transition.

BY IMPLEMENTING THESE RECOMMENDATIONS, SAUDI ARABIA CAN NAVIGATE THE CHALLENGES POSED BY CLIMATE CHANGE, CONTRIBUTE TO THE GLOBAL ENERGY TRANSITION, AND ALIGN WITH THE GOALS OF VISION 2030 FOR SUSTAINABLE ECONOMIC GROWTH AND ENVIRONMENTAL PROTECTION.

REFERENCES

1. <https://www.vision2030.gov.sa/en/projects/middle-east-green-initiative>
2. [mep.gov.sa/MonthlyReports/State of the Economy 2022 EN.pdf](https://mep.gov.sa/MonthlyReports/State%20of%20the%20Economy%202022%20EN.pdf)
3. <https://www.aramco.com/en/sustainability/climate-change/managing-our-footprint/carbon-capture-utilization-and-storage>
4. <https://www.theguardian.com/environment/2022/nov/19/false-solutions-scepticism-over-saudi-carbon-capture-plan>
5. <https://edition.cnn.com/2020/06/10/perspectives/carbon-capture-saudi-aramco/index.html>
6. <https://www.sabic.com/en/news/21603-sabic-first-in-industry-to-launch-polycarbonate-based-on-certified-renewable-feedstock>
7. <https://discovery.kaust.edu.sa/en/article/6493/mof-metallic-mastery/>
8. <https://www.csis.org/analysis/saudi-arabias-hydrogen-industrial-strategy>
9. <https://www.csis.org/analysis/saudi-arabias-hydrogen-industrial-strategy>
10. <https://www.msn.com/en-ae/money/news/two-major-saudi-solar-projects-reach-financial-close-with-investment-of-24bn/ar-AA1fwNMj>
11. <https://asiahouse.org/wp-content/uploads/2023/01/The-Middle-East-Pivot-to-Asia-2022-Digital.pdf>
12. <https://www.constructionweekonline.in/projects-tenders/essar-group-desert-technologies-to-develop-renewable-energy-solutions-in-saudi-arabia>
13. <https://www.bloomberg.com/news/articles/2023-08-28/saudi-arabia-s-7-000-per-person-fuel-subsidies-highest-in-g-20>
14. <https://archiroots.com/leed-certification-in-saudi-arabia/>
15. <https://www.zawya.com/en/business/al-salem-provides-saudis-kaafd-with-smart-building-solutions-o80wma2o>
16. <https://www.arabnews.com/node/2300401/business-economy>
17. <https://english.alarabiya.net/News/saudi-arabia/2023/06/21/Electric-vehicle-demand-booms-in-Saudi-Arabia-amid-move-to-green-mobility>
18. <https://www.thenationalnews.com/business/economy/2023/10/09/saudi-arabia-sets-up-new-ev-infrastructure-company-and-plans-5000-chargers-by-2030/>
19. <https://www.al-monitor.com/originals/2021/05/saudi-arabia-plans-plant-10-billion-trees-desert>
20. <https://www.arabnews.com/node/2138026/saudi-arabia>
21. <https://www.swfinstitute.org/news/95987/billions-saudi-public-investment-fund-bets-on-green-hydrogen>
22. <https://www.reuters.com/world/middle-east/saudi-pif-tadawul-set-up-exchange-carbon-offset-market-spa-2021-09-03/>
23. <https://www.reuters.com/sustainability/saudi-firms-bid-2-mln-tonnes-carbon-credits-kenya-auction-2023-06-14/>
24. <https://www.prnewswire.com/news-releases/rvcmc-successfully-sells-over-2-2-million-tonnes-of-carbon-credits-at-largest-ever-voluntary-carbon-credit-auction-event-in-nairobi-kenya-301851123.html>
25. <https://www.thenationalnews.com/business/energy/2023/10/09/saudi-arabia-launches-greenhouse-gas-crediting-and-offsetting-project/>
26. <https://www.reuters.com/business/environment/adaptation-must-be-front-centre-climate-agenda-uaes-cop28-president-designate-2023-10-08/>



KAFD

مركز الملك عبدالله المالي

kafd.dialogue@kafd.sa