WEALTH

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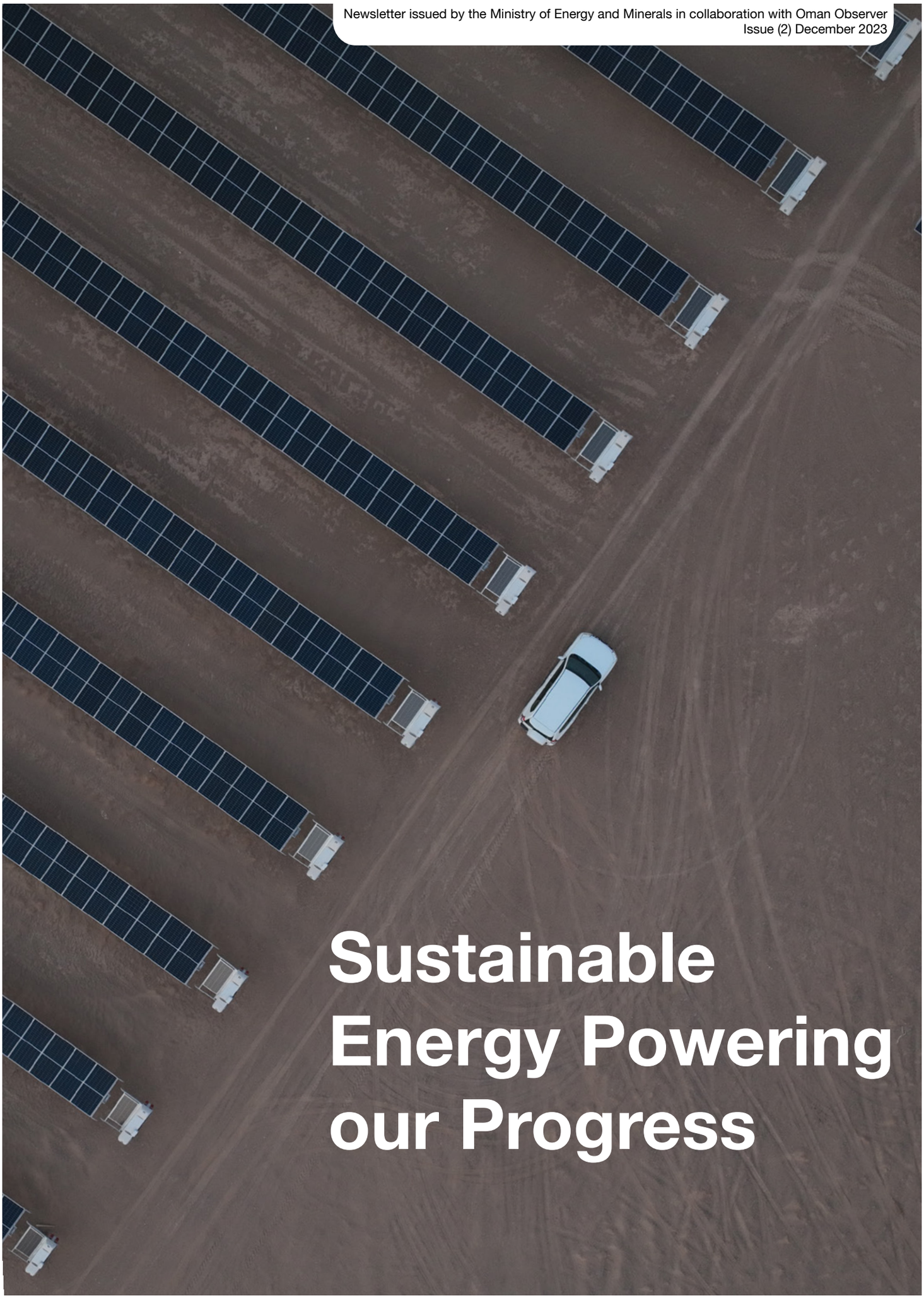

Sustainable Energy Powering our Progress

“COP28: Towards a Sustainable Future”

The Sultanate of Oman represented by a number of government and private entities, has participated lately at the Conference of Parties COP28 in Dubai, along with the 2023 included a number of accompanied summits and conferences during the period from 30 November to 12 December. Oman pavilion at COP28 showcased the Sultanate of Oman efforts and the implemented projects in the field of sustainability. It also contained a number of specialized discussions with experts in sustainability, energy transition, climate and environment.

The participation, under the theme “Oman Sustainable Future” extended the Sultanate of Oman international participation to find practical and sustainable solutions to issues of global concern. It highlighted the Sultanate of Oman commitment in combating climate change, and presented initiatives in this address this issue. It also enhanced Oman’s contribution to cooperation talks with international partners.

The essence of COP lies in its association with the UN Climate Summit, where the world’s highest decision-making body on climate issues convened to chart the course forward. At the heart of these discussions lied the Paris Agreement, a landmark treaty established during COP21 in 2015. The Paris Agreement sets the ambitious goal of limiting global warming to well below 2 degrees Celsius above pre-industrial levels.

Historically, the Conference of Parties (COP) has emerged as a pivotal force, shaping the trajectory of our collective response to climate change. Born out of the United Nations Framework Convention on Climate Change (UNFCCC) in 1992, COP has evolved into an annual global summit where 198 official Parties, including 197 countries and the European Union, converge to address the pressing challenges of our time.
From its humble beginnings with a limited group of government negotiators, COPs have transformed into global mega-events. COP28 in UAE marked the 28th iteration of this critical gathering, underscoring the increasing urgency and significance of global climate discussions.
Against this backdrop, Energy Day at COP28 emerged as a beacon of hope and action in the fight against climate change. This dedicated day within the COP agenda delved deep into the levers and pathways for rapid decarbonization and a just transition across the full energy and industrial value chains.

Central to the discussions on Energy Day is the pivotal role of the energy sector in achieving climate goals. The aim is to accelerate economic and job growth by deploying renewable energy at scale, enhancing energy efficiency, fostering innovation, and initiating actions to reduce emissions in heavy-emitting sectors.
Crucially, these initiatives addressed the decarbonization of oil and gas supplies, leveraging methane abatement and carbon management technologies. Adding to that, it highlighted a commitment to transitioning away from traditional fossil fuels toward sustainable and low-carbon alternatives.

Beyond the technical aspects, it underscored the importance of universal energy access, aiming to ensure that the benefits of sustainable energy reach every corner of the globe while prioritizing the needs of energy workers. This commitment to a just transition recognizes and mitigates the social and economic impacts of the shift towards cleaner energy solutions.

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Energy Transition

National Vision for Sustainability and Net-Zero Emissions

HE. Salim Al-Aufi
Minister of Energy and Minerals

Pursuant to Oman Vision 2040, the Sultanate of Oman is committed to achieve sustainability as a comprehensive working system. Our efforts has already started ensuring the continuous progress toward a future that combines sustainability of energy supply, economic growth, environmental protection and social development.

Sustainable Energy
The Sultanate of Oman strategic direction in energy transition strengthen its position as a key and reliable contributor to securing energy supplies, both locally or globally. We prioritize enabling the growth of the renewable energy and green hydrogen sector, through our projects and expanding those projects by making significant investments. We have successfully completed key milestones of vital projects due to the distinguished natural resources in the Sultanate of Oman, we have constructed multiple solar and wind power stations to generate electricity, in addition to the ongoing projects to increase the renewable energy participation in electricity production to 30% by 2030.
Hydrogen has also become one of the green energy major investments in the Sultanate of Oman, as more than 50,000 km2 are allocated for hydrogen production, in addition to certain opportunities and incentives that have been launched. Our plans are ambitious, leveraging the available data, experience, and resources in the Sultanate of Oman to produce more than 1 million tons of hydrogen by 2030, targeting to produce approximately 8 million tons by 2050, through exploiting 30% of the lands currently allocated, with projected investments of up to $140 billion. Additional opportunities will be announced in the future.

Reduce Emissions
In order to reduce emissions without impacting global economic growth and energy supply, the Sultanate of Oman has adopted a national strategy for energy transition and environmental conservation. Consequently, Oman has developed a road map to achieve net-zero emissions by 2050. It is worth noting that Oman Sustainability Center will monitor the implementation of the national plan and ensure that GHG reduction targets being reached.It will also pursue the development of available opportunities in all target sectors to execute and track the operational plan, considering international and domestic variables that may arise during the implementation period.

Use of Technology
Technology is vital in developing the tools necessary to reduce emissions and improve energy efficiency and consumption. For instance, such technology tools can increase the efficiency of buildings and vehicles by reducing energy usage and consequently reduce fuel consumption and its emissions as well. This is in addition to the potential shift towards renewable energy as a source of electricity and eco-friendly transport, as well as the implementation of technological innovations that significantly contribute to a substantial role in reducing the risks of climate change. These innovations include developed technologies that absorb carbon and utilize it in new industries without harmful impact on environment, or storing it underground.
Additionally, clean nuclear energy technologies are developed and other clean energy sources that contribute to the diversification and sustainability of energy sources, supporting sustainable energy projects, and adopting technologies to lower emissions and conserve natural resources.

Global Integration
Through clear determinants and plans to achieve net-zero emissions and with the increased awareness on the importance of reducing greenhouse gas GHG emissions on climate change which constitutes a transboundary challenge, underscores the Sultanate of Oman extensive involvement in fulfilling its critical role as a party to the UN Framework Convention on Climate Change (UNFCCC) in reducing these emissions. Moreover, safeguarding the environment is a universally shared concern for preserving biodiversity, maintaining ecological balance, and conserving natural resources, This in turn, fosters sustainable to global sustainable development, mitigating the impact of climate change and extreme weather conditions that increase the risk of natural disasters. Hence, collective action towards these changes contributes to the creation of sustainable world that is environmentally, economically and socially viable and secures the present and future generations.

Economic Diplomacy

HE. Sayyid Badr Al Busaidi
Foreign Minister

The Ministry of Foreign Affairs through its missions in Muscat and abroad, continues to engage with economic stakeholders, including business owners, financiers, and government officials. These efforts are geared towards enhancing economic partnership opportunities with the Sultanate of Oman.
The ongoing efforts grounded on several crucial pillars, with all types of energy especially renewable energy, stands as pivotal elements within these ongoing efforts, such pillars are as follows:

The first pillar is the strategic and security pillar. This pertains to the strategic significance of the Sultanate of Oman's geographical location, particularly its extensive coastline along the Indian Ocean beyond the Strait of Hormuz. This unique positioning highlights that all seaports in Oman, including Port of Sohar, Port of Salalah, and Port of Duqm, function as ocean ports.

Furthermore, the second pillar pertains to the Strategic Security of the Sultanate of Oman and is founded on diplomatic relations. Oman maintains positive political relations with a wide range of countries worldwide.
The third pillar revolves around Internal Stability and the current security situation in the Sultanate of Oman. Additionally, Omani traditions and values form the fourth pillar, emphasizing tolerance and the rejection of all forms of extremism.
Furthermore, the Sultanate of Oman boasts several other critical strategic advantages for the renewable energy sector. These include its proximity to shipping lanes in the northwest Indian Ocean, allowing for efficient distribution while minimizing costs. Additionally, the region benefits from abundant solar and wind energy resources, coupled with abundant areas of investable land.

Competitive Edge
The decision by His Majesty the Sultan's Government to set 2050 as the target for achieving net zero and to establish Oman Sustainability Center strengthens and enhances the credibility of Oman's development plans.

Accordingly, this decision has firmly reinforced the notion that Oman, as an early adopters in this field, has a competitive edge for investors and financiers of economic diversification projects, while also contributing to reduce carbon emissions. Recently, numerous projects have been revealed and several MoUs and agreements have been concluded in the renewable energy and green economy sectors. These developments highlight Oman's as a global hub for the production and export of green hydrogen.

International Cooperation in Green Energy

The Ministry of Energy and Minerals is working to establish local and international partnerships that contribute to achieve its goal of green energy. This comes in line with the national strategy for an orderly transition to net zero. The Ministry has already initiated clean energy projects by announcing investment packages in green hydrogen. The Sultanate of Oman represented by the Ministry of Energy and Minerals has signed memorandums of understanding on energy transition with several friendly and brotherly countries, including Kingdom of Saudi Arabia, Kingdom of the Netherlands, Kingdom of Belgium, the Republic of Korea, Japan, Federal Republic of Germany, and Switzerland.

The Ministry of Environment of Korea and the Ministry of Energy and Minerals of Oman signed a memorandum of understanding on cooperation in the field of green transition on August 27, 2023. It would serve as a platform to facilitate cooperation in the fields covering green transition policies, technology development as well as research and development activities between Korea and Oman, to name just a few.

Exchange of Experience
Korea is determined to contribute to the development of the hydrogen economy and the green hydrogen industry. Korea is committed to the goal of achieving carbon neutrality by 2050. As such, Korea attaches a high priority to building its hydrogen sector and is willing to collaborate with Oman and the international partners. As part of its efforts, the Korean Embassy in Oman hosted the Korea-Oman Green Hydrogen Strategy Forum on December 12, 2023 on the sidelines of the Green Hydrogen Summit Oman 2023. By inviting stakeholders in the green hydrogen sector including the Korean companies at the Forum, the Korean Embassy which has contributed to enriching policy dialogues and consolidating networks of private-sector players for further collaboration.

The Efforts of the Sultanate of Oman in the Field of Green Energy
It is widely recognized that Oman has reaffirmed its commitment to the achievement of net zero by 2050 since the endorsement by the highest authority in 2022. On top of its political will, it has implemented a series of policy initiatives of developing green hydrogen industry and renewable energy resources. The partnership between Korea and Oman in the green hydrogen sector offers substantial mutual gains, leveraging each other's strengths and capacities. The bilateral partnership will extend to stakeholders in the green hydrogen industry at regional and global levels, contributing to the fulfillment of zero-carbon emissions.

The Sultanate of Oman Potentials for Investments in Renewable Energy and Green Hydrogen
The international partners share the assessment that Oman enjoys advantages for developing renewable energy and green hydrogen. Among others, the industrial diversification and environmental sustainability strategy embedded in Oman Vision 2040 under the leadership of H.M. Sultan Haitham bin Tariq provides a strong political guidance in pursuing the decisive path. Oman's rich renewable energy resources including solar and wind power, well-developed transportation infrastructure and geostrategic location all add to the components that attract collaboration by the foreign stakeholders and investors.

HE. KIM Kiejoo
Ambassador of the Republic of Korea to the Sultanate of Oman

HE. Stella Kloth

Ambassador of the Kingdom of the Netherlands to the Sultanate of Oman

The cooperation between the Sultanate of Oman and the Netherlands on green energy fits into the broader Dutch policy goal of realizing an affordable, secure, reliable and environmentally sustainable energy system. Just as Oman, the Netherlands has a clear ambition: climate neutral in 2050.
The most important pillars of the Dutch hydrogen import strategy are the development of import-export corridors and creating the conditions to get the hydrogen market off the ground. This means realizing import terminals, infrastructure and regulation, among others. In 2022 the Netherlands and Oman signed a Memorandum of Understanding on green energy to solidify the common commitment to work together on setting up import-export corridors for hydrogen, knowledge-sharing and collaborating developing technologies and standards.

Exchange of Experience and Encourage Dutch Companies to Invest in Oman

The collaboration on green energy offers opportunities for both the Omani and Dutch business community. Whereas Omani companies offer extensive experience in the energy sector, Dutch companies can contribute with novel green technologies.
Concretely, Dutch companies have followed the government's lead – which it took by signing the MoU with Oman by setting up a strategic consortium. This Partners in International Business (PiB) consortium brings together a group of more than 20 Dutch companies from the full hydrogen value chain. This PiB is focusing on the Gulf region and specifically Oman to exchange experiences and explore future investments in the country.
Following the MoU, there was a significant number of Dutch companies that visited the Sultanate of Oman, in particular during the Green Hydrogen Summit and Oman Sustainability Week.
Another example is the cooperation between the Port of Sohar and Port of Rotterdam in the field of logistics and energy, which offers valuable opportunities for exchanging experience and creating a positive and sustainable investment climate. This is supported by the positive and recently formed SOHAR Net Zero Alliance, which is an initiative dedicated to advancing Oman's transition towards carbon neutrality by 2050.

The Sultanate of Oman Features for-Investment in Renewable Energy and Green Hydrogen.

Oman and the Netherlands are natural partners with a robust and enduring strategic relationship. We have a long history of diplomatic relations. In 2025, our countries will celebrate 400 years of maritime relations. Our countries have complimentary qualities for tackling the urgent energy transition.
Oman has decades-long expertise and built-up strengths in the energy sector. Additionally, Oman is well equipped by its excellent geostrategic position at the crossroads between Europe and Asia and outside the Strait of Hormuz, which makes sure that green hydrogen, its derivatives and greenly manufactured products can reach world markets easily and Oman's political stability offers a safe haven for heavy capital investment.
The 2022 MoU between Oman and the Netherlands, setting up import-export corridors, stimulating research cooperation, and training signifies both countries earnestness in how they see the synergy between them.
In sum, the Netherlands sees and acknowledges that Oman has many important features that make it well-positioned for investments in renewable energy and green hydrogen, such as its strategic location and the stability in the political climate, together with the abundance of solar and wind resources as well as land space.

HE. Dirk Lolke

Ambassador of the Federal Republic of Germany to the Sultanate of Oman

Oman and Germany have enhanced their collaboration in the energy sector through the joint efforts of HE. Salim bin Nasser Al Aufi, Minister of Energy and Minerals of Oman, and then Energy State Secretary Dr. Patrick Graichen, Federal Ministry of Economics and Climate Action. A Joint Declaration of Intent (JDoI) was signed in Berlin in July 2022 during the visit of His Majesty Sultan Haitham Bin Tariq Al Said to Germany, solidifying their commitment to reinforce cooperation within the German-Omani Energy Dialogue.
The JDoI provided a framework for joint initiatives, knowledge exchange, and collaborative projects like the Omani-German Energy Dialogue, contributing to global efforts in combating climate change. Over the last eighteen months, within the Energy Dialogue, webinars with participants from the public and private sectors of both nations were held to discuss topics such as the regulatory framework, research and development (R&D), and capacity building.

Exchange of Experience

By adopting a multi-faceted approach that combines advocacy, information sharing, educational initiatives, and strategic partnerships, businesses from our country can actively contribute to the exchange of experiences and play a pivotal role in Oman's burgeoning green hydrogen sector.
The Omani-German Energy Dialogue is a vehicle which fosters collaborations between governmental agencies, industry associations, and businesses from both our country and Oman. A next step could be the decision to deepen the successful energy sector collaboration by establishing an Omani-German Energy and Climate Partnership.
A further avenue to build up the relationship for long term investments is via common R&D projects, training and pilots. R&D organizations, such as Fraunhofer institutes, training providers like TÜV SÜD, and universities like RWTH Aachen, can play a crucial role in supporting educational programs in collaboration with local universities or the Oman Hydrogen Center.

Sultanate of Oman's Green Energy Efforts

Regarding the Sultanate of Oman›s efforts in the field of green energy and its commitment to achieving carbon neutrality by 2050 in alignment with the Paris Climate Agreement, Germany acknowledges and appreciates the strides made by the Sultanate in transitioning towards sustainable and environmentally friendly practices. Oman›s commitment to pursuing green energy initiatives is commendable, and its endeavors towards reaching carbon neutrality by 2050 align with the global goals set forth in the Paris Climate Accord.

Sultanate of Oman Features for Investment in Renewable Energy and Green Hydrogen

Investing in renewable energy and green hydrogen in the Sultanate of Oman holds significant promise. The abundant solar and wind resources, coupled with well-established infrastructure in industrial ports like Duqm and Salalah, create an ideal environment. The existing facilities from the oil and gas sector further enhance Oman's appeal for establishing a decarbonized downstream industry. This strategic location, coupled with political stability, makes it an attractive choice for international developers and the export of green hydrogen. Hydrom, serving as a one-stop shop, provides a robust framework for investments.

HE. Pascal Grégoire
Ambassador of the
kingdom of Belgium to
the Sultanate of Oman

Memorandum of Understanding in the Field of Green Energy
The Kingdom of Belgium has entered into a memorandum of understanding with the Sultanate of Oman to strengthen and deepen our collaboration in renewable energies. Oman is a pioneer in large-scale production of renewable molecules and shares a common vision with Belgium, particularly the desire to develop an international market for these molecules. The development of this sector is also strategic for Oman in continuing its industrial development and preparing for the post-fossil energy era. It is a mutually beneficial partnership supporting the economic and climate ambitions of both countries.
The conclusion of such a memorandum of understanding affirms the willingness of our two countries to collaborate in this field to achieve our climate objectives. We aim to facilitate the opening of the first routes for importing renewable molecules to Europe. Special attention is given to creating local value and jobs. The memorandum of understanding forms the foundation of our collaboration, particularly to facilitate the development of industrial projects between Oman and Belgium.

Exchange of Experience and Encourage Businesses to Invest in Oman
The exchange of experiences and leveraging the successes of early collaborations between Belgium and Oman are crucial to encourage Belgian businesses to invest in the Sultanate of Oman. Projects like the renewable ammonia initiative by DEME Group in partnership with OQ, and Fluxys› involvement in OQGN, exemplify the impact of such bilateral agreements. This is, of course, also influenced by the Sultanate of Oman strong stability, currency, financial institutions, numerous international partnerships, and highly skilled workforce.
The memorandum of understanding facilitates these partnerships between our two countries, firstly by affirming a shared vision and objectives. It strengthens collaboration between our administrations, enabling the identification of potential administrative and tariff barriers that can be addressed. These agreements can also support collaborations between universities, research institutes, and industrial players. All these initiatives aim to bring Belgian and Omani stakeholders closer, facilitating the identification of synergies and the creation of partnerships.

Oman's Target of Achieving Net-Zero by 2050
Oman has demonstrated global leadership by initiating a robust platform for the development of renewable hydrogen projects, notably through Hydrom under the Ministry of Energy and Minerals (MEM). These initiatives support Oman's ambition to achieve climate neutrality by 2050 while modernizing its economy and stimulating local employment. Oman serves as an inspiration not only in the region but globally, evident in its commitment to energy transition and its desire to play a significant role in the global fight against climate change, aligning with the Paris Agreement on climate.

Investment in the Sultanate of Oman Green Energy
The Sultanate of Oman possesses numerous strengths that position it as a key player in the field of renewable energies, particularly in hydrogen and other renewable molecules. Oman boasts exceptional solar and wind potential, nearly constant throughout the year, facilitating the cost-effective production of hydrogen.
The country already has a well-established energy infrastructure. Oman's significant activities in the hydrocarbon sector have laid the foundation for a robust industrial economy, supporting the development of energy infrastructure and offering considerable potential for a professional transition towards renewable energies.
Oman also has well-established port facilities along its extensive coastline. These ports can play a crucial role in facilitating the import of equipment and technologies for renewable energy projects, as well as the export of energy products such as renewable hydrogen or ammonia and other derivatives. The port of Duqm exemplifies the creation of an industrial hub serving the growing renewable energy industry in the country.

Finally, the Sultanate of Oman has a robust educational and training environment in the energy sector, producing the necessary talents for the growth of the renewable energy and hydrogen industry.

Green Transportation

HE. Saeed Al Mawali
Minister of Transport,
Communications and
Information Technology

Technology is crucial in the transportation industry, particularly in the development of electric vehicles. It is important to select an electric vehicle model that suits the weather conditions in Oman. The public electric charging infrastructure is currently undergoing upgrades, with emphasis placed on enhancing accessibility through user-friendly applications and fast, efficient chargers.

Technological advances have led to the development of dual-combustion vehicles, which have been implemented locally within the Sultanate of Oman. These breakthroughs have greatly contributed to reducing greenhouse gas emissions, estimated to have dropped by 40% from trucks and heavy equipment.

Furthermore, electric cranes and smart applications are crucial in reducing emissions during port operations. The "Future of Mobility" program, which connects ships to electric power while docked at the port, will also make a significant contribution to decreasing carbon emissions.
As part of its plan, the Ministry of Transportation, Communications, and Information Technology (MTCIT) aims to reduce emissions from the transport sector by around 3% which is estimated at 22 million tons per year by 2030.

MTCIT has developed a comprehensive strategy to reduce emissions in the transport sector. The initial phase involves the deployment of electric vehicles as it aims to provide 22,000 electric vehicles by 2030. Furthermore, a plan has been developed to facilitate dual-combustion trucks and heavy machinery in reducing their emissions by 40%. In addition to the developed plan for the structure of electric charging points. It includes the installation of 350 public chargers, located along the main and public roads, by 2026.

Regarding ports, the government has developed a detailed roadmap including programs and projects aiming at reducing emissions in ports and maritime sector. Furthermore, a collaborative plan with the Civil Aviation Authority has been set to use sustainable aviation fuel to decrease flight emissions.

These plans provide electric car owners with special benefits, including tax exemptions, no custom charges, and free registration. MTCIT also collaborates with commercial agencies in the Sultanate of Oman to offer exclusive deals on electric vehicles.

Green Energy Minerals

HE. Mohsin Al Hadhrami
Undersecretary
Ministry of Energy and Minerals

The global shift towards clean energy sources highlights the importance of minerals in the development of technologies driving the energy transition. These minerals are essential for meeting the increasing demand for clean energy generation and storage, as well as addressing climate change. Responsible and sustainable extraction practices of the main minerals is essential to mitigate the potential negative environmental and social impacts associated with their production.

Minerals are crucial to accessing renewable energy technology, as they are directly used in manufacturing solar panels, energy storage devices, wind power generators, and other green technologies.

Notably, the Sultanate of Oman has substantial mineral deposits, including nickel, lithium, cobalt, rare earth minerals, copper, and silicon.

The rich geological structure of natural resources in the Sultanate of Oman provides primary resources for these technologies, ultimately contributing to the production of green energy through renewable resources. This abundance creates a connected opportunity for investing in local supply chains and industries, hence supporting sustainable development.

Copper
Copper is a critical element in clean energy sector, primarily valued for its exceptional electrical conductivity and versatility. It is widely used in electrical grids, renewable energy systems, and electric vehicles, ensuring efficient energy transmission and conversion. Copper is also employed in energy storage, heat exchangers for geothermal and solar thermal systems, and conductive coatings for solar panels. Its role extends to efficient lighting technologies and the infrastructure of electric grids, supporting the integration of renewable energy sources.
Oman's Copper deposits are primarily associated with VMS in oceanic crust (Pillow lava , sheeted dyke, and gabbro).

Potash
Lithium is a crucial element in clean energy technologies, especially in lithium-ion batteries used in electric vehicles, renewable energy storage, grid energy storage, and various portable electronic devices. Its lightweight and high-energy storage capabilities have made it a cornerstone of the clean energy transition.
Oman's Lithium deposits are primarily associated with Potash in Umm al Samim salt basin.

Silica
Silicon is a pivotal material in clean energy technologies, primarily through its use in solar photovoltaic cells, powering solar panels and promoting solar energy generation. It's also employed in energy storage, enhancing lithium-ion batteries' capacity. Silicon's role extends to semiconductor devices for power electronics, enabling efficient renewable energy systems, and in LED lighting, contributing to energy efficiency. Additionally, advanced silicon-based materials like silicon carbide and gallium nitride are used in power electronics, increasing energy conversion efficiency. Silicon's abundance and versatility make it a fundamental component in clean energy applications, propelling the transition to more sustainable energy sources.
Oman's Silicon deposits are primarily associated with quartzite and silica sand in Mahout and Quriyat.

Chromite
The Platinum group metals co-exist with Chromite in the nothern part of the Sultante of Oman. There are six Platinum group metals: Platinum (Pt), Palladium (Pd), Rhodium (Rh), Osmium (Os), Iridium (Ir) and Ruthenium (Ru) out of which Pt and Pd:

- Catalytic Converters: PGMs like Platinum, Palladium, and Rhodium are used in catalytic converters to reduce emissions from internal combustion engines.
- Hydrogen Fuel Cells: Platinum and Palladium serve as catalysts in hydrogen fuel cells, making them efficient and clean sources of energy.
- Electrolyzers: Iridium and Ruthenium are used as catalysts in electrolyzers to produce green hydrogen from water using electricity.
- Renewable Energy: PGMs are used in various components of renewable energy technologies, including solar cells and photodetectors.
- Carbon Capture and Storage (CCS): Ruthenium-based catalysts are explored for capturing and storing carbon dioxide emissions.
- Energy-Efficient Lighting: Ruthenium compounds enhance the performance of advanced LEDs.

Laterite
Cobalt plays a significant role in clean energy technologies, particularly in the development of lithium-ion batteries, which are commonly used in electric vehicles (EVs) and renewable energy storage systems.
Nickel is a critical element in various clean energy technologies, particularly in battery applications for electric vehicles (EVs) and renewable energy storage, as well as in hydrogen production (through a process called steam methane reforming (SMR)).
Oman's Cobalt and Nikel deposits are primarily associated with Laterite in Ibra , Alkamil Wal Wafi, and Sur.

Carbonatite
Rare earth elements (REEs) are integral to clean energy technologies, playing key roles in improving energy efficiency and sustainability. They are crucial in the development of strong, lightweight permanent magnets for wind turbines and electric vehicles, enhancing energy conversion and storage. REEs also contribute to energy-efficient lighting, serve as catalysts for hydrogen production, and find applications in advanced batteries and certain types of solar panels.
Oman's REE deposits are primarily associated with alkaline igneous rocks and carbonatite in Sal and khawr Jirama.

Oman's Distinctive Approach for Energy Sector

Dr. Fatih Birol
Executive Director
International Energy Agency

I am excited to shed light on Oman's compelling journey towards energy transformation, its strategic commitment to sustainability, and why it stands as a beacon of opportunity for project developers, innovators, and investors. Oman's unique approach makes it an exemplary showcase in the ever-evolving global energy landscape.

Oman's unwavering commitment to achieving net-zero emissions by 2050 is a testament to its dedication to sustainability and environmental responsibility. This commitment alone sets a strong foundation for Oman's emergence as a global leader in the clean energy sector. With oil and gas currently contributing a substantial part of Oman's export income, the nation's prominence in hydrocarbon production underscores its critical role in the global energy transition. Oman's transition isn't just an isolated endeavor; it's a pivotal shift that has the potential to influence the entire energy landscape.

Oman's strategic vision, supported by robust numbers and a commitment to sustainability, paints a compelling picture for project developers, innovators, and investors. Oman's journey towards a sustainable, resilient future is an opportunity that cannot be overlooked. It offers the potential for significant returns on investment while contributing to a greener and more sustainable planet. Oman is not just a destination; it's a strategic partner in shaping the future of energy, and it invites you to be a part of this transformative journey towards a cleaner and brighter tomorrow.

Ambitious Targets: Oman's Renewable Hydrogen Production

Oman has set its sights on a formidable goal: producing no less than 1 million tonnes (Mt) of renewable hydrogen by 2030. This ambition escalates to an impressive 3.75 Mt by 2040 and a staggering 8.5 Mt by 2050. These targets are more than mere numbers; they represent a substantial, untapped source of export revenue. The IEA's analysis firmly supports this vision, confirming that Oman's 2040 hydrogen target alone would already account for an astounding 80% of today's LNG exports in energy-equivalent terms, with the 2050 objective nearly doubling this output.

Cost Efficiency: Oman's Ascension as a Global Hydrogen Exporter

Oman is on an exciting trajectory towards highly cost-effective renewable hydrogen production. IEA analysis confirms that by the end of this decade, the cost of producing renewable hydrogen in Oman could plummet to as low as USD 1.6 per kilogram (kg) of H_2. Such cost-efficiency, in addition to other factors, is poised to make Oman the world's sixth-largest exporter of hydrogen by 2030. In fact, the IEA's global assessment of hydrogen projects suggests that Oman could even claim the title of the largest hydrogen exporter in the Middle East during this decade.

Ammonia as the Initial Transport Medium for Renewable Hydrogen

Oman's initial approach to transporting renewable hydrogen abroad involves the use of ammonia. Anticipated reductions in hydrogen production costs, coupled with the cost-effective nature of ammonia transport by sea, could result in a supply cost of renewable ammonia from Oman as low as USD 450 per tonne over a distance of 10,000 km by the end of the decade. This competitive pricing makes renewable ammonia comparable in cost to historical ammonia market prices, significantly below the record levels experienced in 2022 due to natural gas price surges.

Unlocking a Greener Future through Strategic Investments

Investing in renewable hydrogen is not only a pathway to a greener future but also a significant economic opportunity for Oman. To scale up renewable hydrogen production, substantial investments are imperative, with a cumulative requirement of approximately USD 33 billion by 2030. This investment includes USD 20 billion for dedicated renewable power production for hydrogen, USD 13 billion for electrolysis and ammonia conversion, and an additional USD 4 billion to achieve the 20% renewables share target in the power mix. With a resolute commitment to this vision, Oman has the potential to reduce domestic natural gas consumption by 3 billion cubic meters annually, eliminate 7 million tonnes of CO_2 emissions by 2030 (equivalent to 7% of baseline emissions), and generate significant economic value, potentially reaching double-digit billion-dollar levels in the long term.

«In Oman's pursuit of renewable hydrogen, we see not just ambitious targets but a significant economic opportunity. The nation's strategic advantages and commitment make it a trailblazer in the global energy landscape, offering confident investors the chance to shape a sustainable future while reaping the rewards.»

Dr. Abdullah Al-Abri
Consultant and Oman's Representative at the IEA

Sustainable Green Financing

HE. Abdullah Al Salmi
Executive President of Capital Market Authority

Sustainable Green Fund is a fund that targets "achieving economic development by eliminating pollution and emissions of greenhouse gases, decreasing waste to the minimum level, and improving the efficiency of using natural resources". Over the last one and a half decades, the international sustainable green fund market has witnessed rapid growth under the development of financial instruments, such as green bonds, green loans, green investment funds, green insurance, and green Sukuk. There are also social bonds, sustainable sukuk, etc.

The Capital Market Authority CMA started to develop a national road map to adapt nonbanking financing to the requirements of sustainable green fund from three key starting points:

The first starting point is to achieve the strategic goals of Oman Vision 2040, especially, providing innovative financing products and preserving the natural and environmental heritage of the Sultanate of Oman.

The second starting point is to implement the outcomes of the net zero laboratory, especially, with regard to financing projects that lead to the targets of the national strategy for achieving net zero and implementing the relevant projects, in addition to those projects related to the fulfillment of the goals of sustainable development.

The third starting point is to frame the efforts made in the financial nonbanking sector towards sustainable green fund and ESG (environmental, social, and governance), ensuring gathering the necessary momentum of regulatory mobility and initiatives to achieve the desired impact and results.

All this meant the necessity of providing regulatory frameworks and enabling environment to attract green and sustainable investment in the nonbanking sector to guarantee that this type of fund is governed, managed, and improved in accordance with the best international practices.

Roadmap to Green Financing

The current legislative structure has been prepared to issue financing instruments compatible with the requirements of the green and sustainable fund, but not designated for this type of fund. Exporters can explain all aspects related to the instruments of the green and sustainable fund (bond and sukuk in particular) in the issue prospectus in accordance with the standards and principles of the green fund, social financing, and sustainable financing.

As you know, this year, the Capital Market Authority Board of Directors has approved a national road map to adapt the financial nonbanking sector to the requirements of the green and sustainable fund. The road map includes five axes, and it is divided into three key phases including several initiatives targeting regulatory frameworks, building capacities in CMA and the sector, enhancing the disclosure aspect, data access, and encouraging turning to such green and sustainable financial instruments.

Currently, CMA is engaging in issuing an integrated system of appropriate regulatory frameworks designated to the green fund, such as the bonds and sukuk regulation updated by the standards of governance and disclosure for different types of traditional and innovative bonds and sukuk, a regulatory framework with the controls of disclosure according to the standards of ESG, and a regulatory framework with the controls of registering and approving the information providers and offices of audit qualified for submitting specialized reports and verifying the extent to which the instruments to be issued adapt to the international and national requirements and principles of the green and sustainable fund.

Legislation for sustainable Green Financing

CMA continuously encourages several authorities in the Sultanate of Oman and works with them on developing programs of green and sustainable fund directed to national and international institutions in accordance with the previously mentioned system, in addition to providing advice consistent with the international principles of green and sustainable fund in accordance with the National Strategy for an Orderly Transition to Net Zero and in cooperation the governmental and private projects which is required, to achieve net zero to be funded by green or sustainable securities to enable investors to plan their green and sustainable investments.

National Multi-Hazard Early Warning Center

Abdullah Al Khadoori
Director General
of Meteorology
Civil Aviation Authority

Climate Change and Adaptation

Climate change and its effects stand as one of the main issues of global concern. Several countries around the world are witnessing different effects of climate change, some posing imminent threats to lives and cause substantial financial losses upon countries. Therefore, countries worldwide have endeavored through diverse ways to find solutions to these challenges, be it through mitigation strategies or adapting to the ramifications of climate change.

The Sultanate of Oman has also made substantial endeavors to contribute to mitigating the impact of climate change. Initiating the development of essential plans and methodologies, Oman is optimally addressing these variables. It has developed important strategies for both mitigating and adapting to the consequences of climate change. Substantial financial investments have been directed towards investment in clean energy, encompassing wind, solar, and, more recently, hydrogen fuels. Furthermore, Oman has undertaken measures to confront climate change effects by strengthening and enhancing the early warning system. This involves incorporating suitable tools to ensure optimal management of climate changes, including tropical cyclones, flood rains, and heat waves.

National Multi-Hazard Early Warning Center

Multi-Hazard Early Warning System stands as a cornerstone institution that has contributed to the success of the Sultanate of Oman in facing severe weather conditions and minimizing their impact. Such system has been linked to an effective administrative system to respond to these warnings and to coordinate efforts during their occurrence. The inception of the National Multi Hazard Early Warning System was deliberated in 2004, with the Civil Aviation Authority entrusted with the responsibility of establishing and operating the center in 2008. Ultimately, the center was inaugurated in March 2015.

Throughout the day, the said Center diligently monitors the atmosphere and seas of the Sultanate of Oman and its vicinity. This involves a comprehensive analysis of atmospheric data derived from diverse sources, including monitoring stations, satellites, and radars. These resources are used to understand the present weather conditions and forecasting changes. Air specialists also leverage numerical models to predict future weather conditions. The dissemination of these data is tailored to meet the specific operational needs of users. In instances where severe weather conditions with potential threats to life or property are either monitored or anticipated, the center's duty specialists promptly activate the manual of exceptional operational procedures. This activation results in the issuance of detailed reports, alerts, and warnings regarding the hazardous weather situation to the community. Detailed bulletins are then issued to the National Center for Emergency Management and the military authorities associated with the National Committee for Emergency Management. These bulletins provide a meticulous explanation of preparedness, besides activating plans for dealing with exceptional and emergency cases.

The National Early Warning Center is also equipped with a dedicated tsunami early warning system, incorporating earthquake analysis systems, simulation systems, alarms, an electronic decision support system, besides sending warnings related to the formation of tsunamis. This advanced system predicts the elevation of waves and forecasts their arrival time along the coasts of the Sultanate of Oman. Seismic activity is monitored through twenty-one earthquake monitoring stations within the Sultanate of Oman, complemented by an international monitoring network. Additionally, ten GPS stations, ten sea level rise stations, and ten marine radars are strategically deployed to monitor sea level fluctuations.

Reduce Economic Costs and Human Losses

The aforementioned Center plays a crucial role in mitigating economic costs and human losses stemming from extraordinary weather events. This is achieved through the delivery of high-quality early warning information to responders, coupled with efficient coordination, as fewer economic and human impacts were recorded during the case of Hurricane Shaheen 2021 and Hurricane Mekunu in 2018 compared to Hurricane June 2007, taking into account the variations in population density and terrain across these instances.

Oman Sustainability Center

Sustainability is one of the most prominent issues that preoccupies the world in this era, as countries seek achieving a balance between meeting the needs of the present and preserving the capabilities of future generations. In this context, the establishment of Oman Sustainability Centre comes as an important step and strategic vision for the Sultanate of Oman to achieve this noble goal.

The main role of Oman Sustainability Center is to orchestrate various national efforts to net zero target in the Sultanate of Oman by 2050, by providing strategic consultations and policy guidance, supporting various sectors in data-base, decision-making and raising community awareness of the importance of sustainability, and climate change. This is in addition to coordinating and tracking the implementation of the national plans, supporting sustainable financing, and promoting technological progress in the private sector, in order to achieve the country's sustainability goals.

khalid Al Ghammari

Project Director- Oman Sustainability Center

Oman Sustainability Centre conducts a variety of responsibilities based on eight key components of climate governance and sustainability and works to ensure that sustainable goals are coordinated and achieved through the implementation of these responsibilities in an integrated and consistent manner. The Center's responsibilities combine organizing objectives, evaluating performances, and enhancing cooperation among various stakeholders, and these responsibilities include the following:

1. Prepare and update the national plan to mitigate and adapt to the consequences of climate change on a regular basis or periodically. This includes developing a clear map for decarbonization across economic sectors, estimating the solidarity, and economic and social impact to achieve net zero target, and determining proposed budgets for greenhouse gas emission reduction at the national and sectoral levels on regular basis.
2. Provide extensive consultation to institutions in Oman on policies and executive frameworks for climate and sustainability included in national plans. This includes proposals to improve laws, policies and regulations related to climate change and sustainability on a regular basis.
3. Coordinate and implement the comprehensive interface for sustainable projects in the Sultanate of Oman by developing a methodology for selecting sustainable projects and providing support to Ministries and other entities, regarding the implementation of sustainable projects, setting criteria for assessing priorities, monitoring and following-up, and enhancing cross-sector communication. Besides identifying accredited certification bodies for sustainable products and facilitating their accreditation.
4. Coordinate efforts to develop a national framework for sustainable financing and acting as a sustainable financing center for the Sultanate of Oman in line with the United Nations financial mechanisms on climate and facilitating access to international financing.
5. Monitor and evaluate sustainability Key Performance Indicator "KPIs" in the Sultanate of Oman, enhance transparency towards the "United Nations Framework Convention on Climate Change "UNFCCC" and other parties and enhance the Sultanate's participation, including monitoring, reporting and verifying Green House Gas "GHG" emissions data, and analyzing them as well as simulating their future impact.
6. Coordinate sustainable capacity building and enhance communication and participation between various entities within the Sultanate of Oman. This includes supporting sustainable capacity building by identifying needs and priorities, adopting global best practices, and collecting initiatives related to capacity building.
7. Coordinate knowledge and research activities related to sustainability in the Sultanate of Oman, which includes enhancing the level of knowledge on sustainability issues and providing guidance to corporates to develop sustainability projects.
8. Develop a national carbon credit market strategy for the Sultanate of Oman and build carbon market framework whick will manage the supply and demand balance of carbon credits and Support project developers in accrediting and claiming carbon credits for their projects.

Mitigation of Routine Flaring

The Sultanate of Oman's endeavors to reduce greenhouse gas emissions within the oil and gas sector have been realized through the enactment of regulations in line with the approach of resource sustainability and environmental preservation. This commitment stands as a contribution with nations worldwide in mitigating global warming. This commitment is evident in the adherence to a series of policies and programs that emanate from the ratification of the Kyoto Protocol in 2005 and the Paris Climate Agreement in 2016. These agreements commit the parties to reduce greenhouse gas emissions, by the following:

Mitigation of Routine Flaring: This involves the disposal of certain quantities of natural gas during oil and gas production operations. These volumes are considered essential to these operations and are difficult to manage for technical and economic reasons.

In 2017, the Sultanate of Oman signed off the World Bank's initiative to acheive zero routine flaring by 2030. In line with this commitment, it established the National Committee to reduce routine flaring and is working with operational partners to explore both conventional and unconventional mechanisms to mitigate routine flaring through by acheiving Zero Routine Flaring by the end of 2027. This includes optimizing production processes and constructing modern facilities for the reuse of gas in electricity generation. This is in addition to implementing cutting-edge technologies to refine and increase gas production, as well as implementing gas injection into oil reservoirs to increase secondary oil recovery. Daleel Petroleum is one of the outstanding examples of the cessation of routine flaring through the implementation of incremental and effective measures. Until 2008, Daleel Petroleum was flaring a substantial portion of its associated gas. However, with the commissioning of the first LPG extraction locomotive and the commissioning of condensate processing, a 28% reduction in flaring practices was achieved. In 2018, the second locomotive dedicated to gas processing, LPG extraction, and condensate extraction was operated. Furthermore, the start of surplus gas exportation to the gas network resulted in a substantial 80% reduction in total gas flaring. The goal of eliminating routine gas flaring by 2023 has been achieved through the implementation of the AP Gas Recovery System. This system redirects the gas to the processing plant again.

Reducing Methane Emissions: Methane, as the main component of natural gas, is a major contributor to global warming. In line with the Sultanate's commitment to reduce greenhouse gas emissions, it became a foundig member of the Global Methane Pledge in June 2022. As part of this pledge, the Sultanate of Oman is committed to reducing methane emissions by 30% before 2030. This year, the Sultanate of Oman has participated in the United Nations initiative to monitor methane emissions, using satellite technology through the "Mars Methane Alert and Response System" (MARS). This effort culminated in the formulation of a national strategy to reduce methane emissions, known as the "Oman Methane Action Plan" (OMAP). Implementation of OMAP began several months ago in collaberation with governmental and private entities, including the Environment Authority, Sultan Qaboos University, industry companies such as Daleel Petroleum and Petroleum Development Oman, among others.

The Sultanate's of Oman commitment to plans aimed at reducing greenhouse gas emissions and curbing the flaring of various types of gas will have positive outcomes, as it will reduce emissions and thereby mitigate the anticipated impacts of climate change. As a result, such efforts will help protect the environment and public health, while promoting conservation and reuse of previously wasted resources. The resulting effect extends to the creatingnew job opportunities in renewable energy and energy efficiency, as well as attracting modern and innovative technologies to the country. This includes technologies related to cryptocurrency mining, cloud computing, and various computing applications, thereby improving the overall quality of life for the citizens of Oman.

Dr. Saleh Al Anbouri

Director General of Oil and Gas Exploration and Production
Ministry of Energy and Minerals

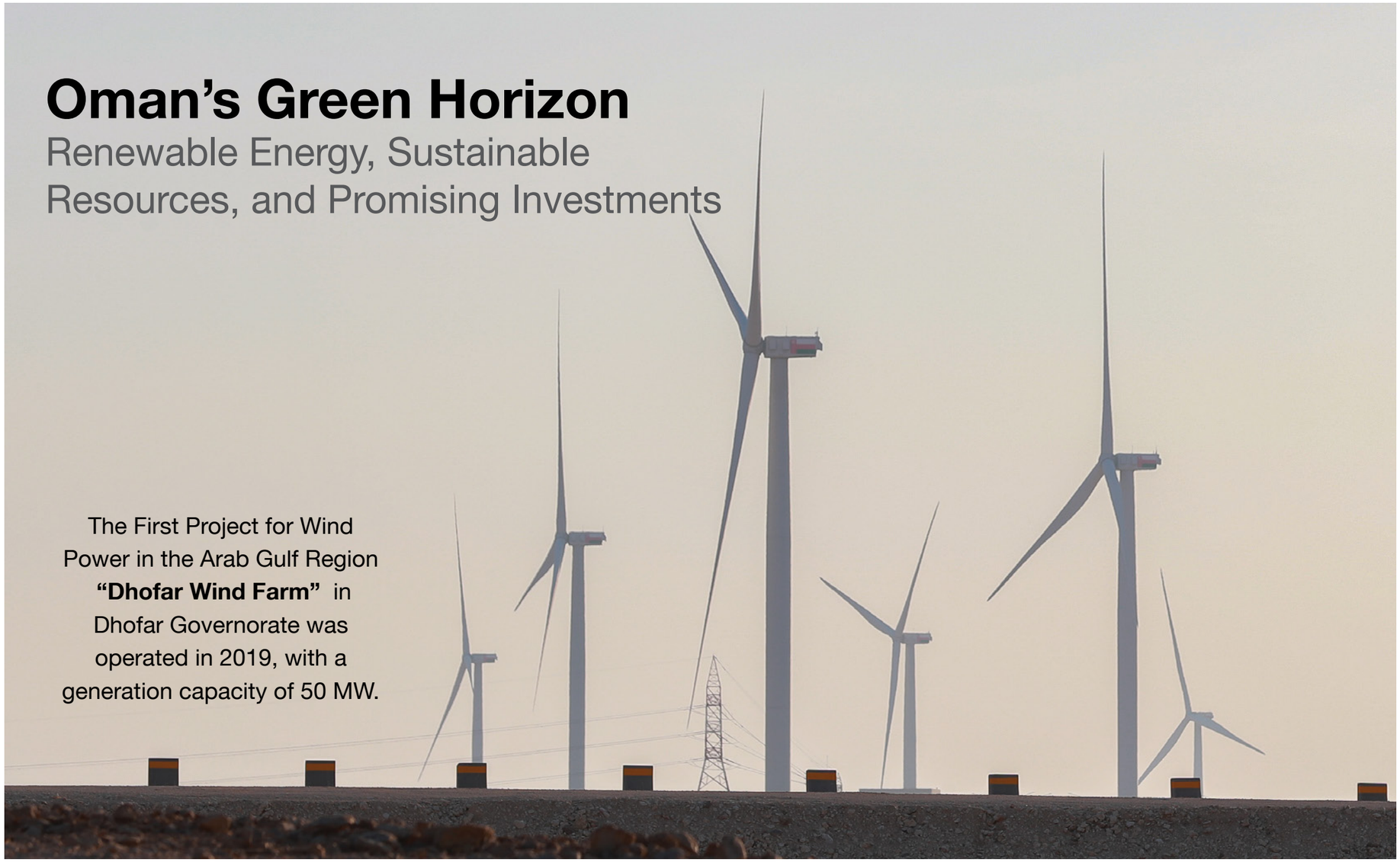
Zero routine flaring by 2030

Reducing methane emissions by 30% before 2030

Projects

Oman's Green Horizon

Renewable Energy, Sustainable Resources, and Promising Investments



The First Project for Wind Power in the Arab Gulf Region **"Dhofar Wind Farm"** in Dhofar Governorate was operated in 2019, with a generation capacity of 50 MW.

Dr. Abdullah Al Shereiqi
Renewable Energy Expert
Ministry of Energy and Minerals

The strategic direction of the Sultanate of Oman focuses on the sustainability of natural resources through the utilization of the renewable energy resources, to enhance the green economy and reduce the operational costs in the production sectors and promote their competitiveness.

Furthermore, we have taken basic steps in regulating the hydrogen sector, developing the legal frameworks and policies required for its development, allocating suitable sites for its production to enhance attracting investments, and working on localizing this technology and preparing the studies necessary to be aligned with the international transformations towards the elimination of carbon emissions and because of the extensive uses of hydrogen which contribute to diversifying energy resources, eliminating carbon emissions, and promoting the economic growth. Moreover, several opportunities and intincives directed to investment in the Hydrogen Sector have been announced since our aspirational plans aim to achieve one million tons of hydrogen production by 2030.

Our national investment in the development of integrated infrastructure, including electricity grids and stations over the last decades have been positively reflected in the credibility of the performance of the electricity Sector. Furthermore, the economic and strategic direction of exploitation all types of renewable energy resources have enhanced attracting international investments and economic efficiency.

The Sultanate of Oman's National Strategy for an Orderly Transition to Net Zero is considered as a comprehensive analysis and a strategic road map of Oman's endeavor to achieve a net zero by 2050 in major sectors. The Electricity Sector is one of the major sectors that produce 17.1 million tons of CO_2 emissions which is equivalent to 19% of the total emissions in the sultanate of Oman.

Moreover, in 2019, Oman started to operate the first project of wind power in the Arab Gulf Region in Dhofar Governorate "Dhofar Wind Farm" with a generation capacity of 50 MW. Also, the production of electricity from solar power in Oman increased in 2022 to a percentage of 138 % compared to 2021 after operating Ibri Solar Power Plant with a generation capacity of 500 MW.

In addition, several projects for solar power have been commercially operated such as Amin Solar Power Plant with a capacity of 100 MW and Qabas Solar Power Plant with a capacity of 25 MW, as well as operating the Solar power plant for Water Desalination with a capacity of 17 MW in Sur which is considered the biggest solar power system of water desalination plants in the Sultanate of Oman as its annual capacity of producing electricity from a renewable resource exceeds 32 thousand MW per hour. Furthermore, work is in progress to establish the two stations Manah 1 and 2 for Solar Power with a capacity of 1000 MW and it is expected to start their commercial operation during 2025.

The peak demand in the grid-connected PV system has increased by a percentage of 2.4%. In 2022, the peak demand reached 6.798 MW compared to 6.637 in 2021. The peak demand in the Sultanate of Oman is expected to increase at an annual rate of 3% to reach 8.110 MW in 2028, considering that the sultanate of Oman has developed strategic plans and goals to raise the percentage of the participation of renewable energy and reduce dependency on natural gas in producing electricity by 30% by 2030. There is a plan to implement renewable energy projects at a capacity of more than 3800 MW to produce electricity and connect it to the main electricity grid, including:

- Ibri III Solar PV project with a capacity of 500 MW in 2027.
- Jalan Bani Bu Ali Wind farm (IPP) with a capacity of 100 MW in 2027.
- Duqm Wind Farm with a capacity of 200 MW in 2027.
- Ras Madrakah Wind Farm with a capacity of 200 MW in 2027.
- Waste to Energy Plant with a capacity of 140 MW in 2028.

Energy Diversification

Sustainable Development and Environmental Protection

Alhaitham Al Mushaifri
Director of Communication and Media
Ministry of Energy and Minerals

Sustainability and diversification of energy resources are essential for ensuring the sustainable development and environmental protection. Energy is vital to modern civilization, supporting the economy and industry while meeting the consumption needs of countries and societies. Therefore, the increase in production has resulted in a greater demand for energy, emphasizing the need for countries to ensure the strategic security of their energy supply, while also prioritizing sustainability for the development, the environment and the climate.

Embracing sustainability as a primary pattern of resource consumption, with an integrated series of measures, is pivotal in preserving and enhancing the economy through a long-term strategy. This integrated approach effectively reduces greenhouse gas emissions, preserves natural resources, and contributes to combating climate change. This, in turn, leads to positive outcomes in the consolidation of social justice, by meeting the energy needs of the present generation without compromising the ability of future generations to meet their energy requirements while preserving the natural ecosystems.

Achieving a balance between ongoing energy utilization and the transition towards renewable and sustainable resources requires the development of technologies that contribute to environmental protection. This involves promoting innovation in the field of renewable energy and adopting production methods designed to significantly minimize emissions. Reducing or stopping routine flaring during production processes, and adopting effective tools to safely manage the use, capture, transport and storage of carbon dioxide can achieve the aforementioned goals. These endeavors can be encapsulated within a framework that promotes the cleaner and low-emission utilization of fossil energy. In addition to the imperative of energy transition, it is important to ensure a secure energy supply while actively contributing to achieving the net zero target.

The national endeavors in the Sultanate of Oman to achieve sustainability in the energy sector serve as a conscious model towards the balance in oil and gas production with the highest standards of efficiency and quality. Additionally, efforts are directed towards enhancing the efficiency of energy consumption and adopting low-emission development techniques, outlined in a clear timeline. The nation is actively engaged in projects of carbon capture and storage technologies. Moreover, there is a strategic trend towards energy transition, characterized by sustainable projects that utilize renewable natural elements, such as solar and wind power in the Sultanate of Oman. These initiatives are executed at levels designed to effectively meet the planned objectives. There are extended spaces available along the coasts of the most important sea routes contributing to hydrogen production.

The Sultanate of Oman is a significant country, endowed with natural and geographical potentials, coupled with technical expertise in energy production and export. It is capable of playing a pivotal role in enhancing global energy security and diversity by producing low emission and renewable energy, with hydrogen emerging as a key focus. Thus, it contributes to the sustainability and diversity of energy, not only at the local level but also globally through export, as it will ultimately achieves the net zero target, which the Sultanate of Oman is committed to achieving by 2050.