

SPECIAL REPORT WHITEPAPER



Knowledge Partners



What are Oman's Untapped Natural Advantages in the Digital & Climate Economy?

The **Muscat Ideas Summit** is a dedicated roundtable workshop designed to surface Oman's untapped natural advantages in the climate and digital economies -- its primary objective is to identify opportunities for transformative growth by harnessing these underutilized resources.

Climate Economy

Oman's potential for offshore wind energy along its Indian Ocean coastline is a game-changer waiting to happen. While the country has established some onshore wind projects, offshore developments could dramatically expand its renewable energy capacity, positioning Oman as a regional leader in wind power. Similarly, Oman's vast desert and coastal areas are ideal for large-scale green hydrogen production. Although still in its infancy, green hydrogen initiatives could enable Oman to become a global hydrogen hub, meeting international demand for clean energy. Another underutilized asset is Oman's blue carbon potential. With rich marine ecosystems such as mangroves and seagrasses capable of absorbing significant amounts of carbon, Oman has a natural advantage in contributing to global climate goals. However, enhancing these natural carbon sinks through dedicated initiatives remains a largely untapped opportunity.

Digital Economy

In the digital realm, Oman's access to international submarine cables positions it as a potential hub for global data centers and digital infrastructure. Despite this connectivity and the availability of affordable land for energy-intensive facilities, Oman has yet to fully exploit its position. By integrating renewable energy into its digital infrastructure, Oman could create a sustainable data economy, attracting international investments and advancing its status as a global digital hub.

Moving Forward

By leveraging its natural and strategic resources, Oman can enhance its role in both the global climate and digital economies. Focused investments in offshore wind, green hydrogen production, blue carbon initiatives, and digital infrastructure powered by renewables could unlock significant economic and environmental benefits, reinforcing Oman's leadership in these critical sectors.

In 2024, Oman showcased impressive advancements across fiscal, social, and economic domains, underpinned by structural reforms and prudent financial management.

Fiscal and Economic Stability

Oman achieved a remarkable reduction in its public debt-to-GDP ratio, from 62.3% in 2021 to 35% by mid-2024, bolstered by consecutive budget surpluses of 2.7% in 2022 and 2.2% in 2023. These achievements enhanced fiscal resilience and led to significant credit rating upgrades, with Standard & Poor's elevating Oman to "BBB-" with a stable outlook and Moody's revising its outlook to positive, reaffirming its "Ba1" rating. This marked Oman's return to stable investment status, overcoming nearly seven years of challenges linked to oil price volatility and the COVID-19 pandemic.



Social Reforms and Institutional Strengthening

A key milestone in 2024 was the launch of a unified social protection system, which consolidated pension funds and restructured schemes to improve sustainability and inclusivity. This reform represents Oman's commitment to addressing social welfare challenges while ensuring long-term financial viability. Global Rankings and Innovation

Oman made significant strides in global rankings, reflecting its focus on innovation and competitiveness:

- Climbed 39 places in the 2024 Index of Economic Freedom, securing the 56th position globally.
- Advanced to 11th place in the Entrepreneurship Index, demonstrating a stronger, business-friendly environment.
- Improved by 10 ranks in the Global Innovation Index, achieving top-20 positions in five sub-indicators, including second globally in government spending per student.

In higher education, Sultan Qaboos University rose 92 places in the 2025 World University Rankings, landing at 362nd globally, highlighting Oman's investment in academic excellence.

Sustainability and Foreign Investment

Oman's sustainability efforts gained momentum, with the country leaping from 149th to 50th place in the Environmental Performance Index, reflecting its dedication to environmental protection. Foreign direct investment (FDI) saw a sharp 21.6% increase in 2023, reaching RO 25.05 billion, up from RO 20.59 billion in 2022, reinforcing Oman's status as a desirable destination for international investors.

A Resilient and Dynamic Economy

These achievements illustrate Oman's holistic approach to growth, integrating fiscal discipline, social reforms, and sustainability initiatives. By fostering innovation and maintaining a business-friendly climate, Oman has solidified its reputation as a resilient and dynamic economy, poised for continued progress in the region and beyond.

GEOGRAPHY

Oman possesses several natural advantages in both the climate and digital economies, which position it well to be a significant player in these sectors:

NATURAL ADVANTAGES IN THE CLIMATE ECONOMY

1. Abundant Solar Energy Resources:

Oman has one of the highest solar insolation rates in the world, with clear skies for most of the year. This makes it an ideal location for large-scale solar energy projects. The country has been investing in solar power plants and other renewable energy infrastructure to diversify away from fossil fuels.

2. Wind Energy Potential:

Certain regions in Oman, particularly along the coastal areas, have strong and consistent wind speeds, offering potential for wind energy development. Dhofar Wind Power Project is an example of Oman tapping into this resource.

3. Geographic Location for Green Hydrogen Production:

Oman's vast deserts and coastline offer space for renewable energy projects to produce green hydrogen, a key fuel in the decarbonization of industries like shipping, aviation, and heavy manufacturing. Its proximity to international shipping lanes provides an added logistical advantage for exporting green hydrogen.

4. Proximity to Trade Routes:

Oman's location outside the Strait of Hormuz and along key maritime routes gives it access to markets in Asia, Africa, and Europe. This is crucial for the export of clean energy products like green hydrogen, ammonia, and renewable electricity.

5. Marine Biodiversity:

Oman's long coastline and rich marine biodiversity provide opportunities for blue carbon initiatives, where the country can leverage its marine ecosystems like mangroves and seagrasses to absorb CO₂. These initiatives can also contribute to climate mitigation while preserving marine habitats.

6. Natural Gas Resources:

While Oman is transitioning to renewables, its natural gas resources can serve as a transitional fuel. By integrating carbon capture and storage (CCS) technologies, Oman can reduce the carbon footprint of its gas production.



NATURAL ADVANTAGES IN THE DIGITAL ECONOMY

1. Strategic Geographic Location for Data Centers:

Oman's geographic position makes it a natural hub for data traffic between Europe, the Middle East, Africa, and Asia. It can serve as a regional data center hub, offering low-latency connectivity to a wide range of markets.

2. Access to International Submarine Cables:

Oman's coastline hosts several international submarine communication cables, connecting it to global internet traffic routes. This connectivity is essential for cloud services, data centers, and digital economy activities.

3. Digital Infrastructure Development:

Oman has been investing in expanding its digital infrastructure, including fiber-optic networks, to support high-speed internet and mobile communications. This supports digital industries, such as fintech, e-commerce, and digital entrepreneurship.

4. Supportive Regulatory Environment:

The Omani government has been focusing on initiatives like e-government, digital transformation, and tech-based entrepreneurship, creating an enabling environment for the growth of the digital economy.

5. Young and Tech-Savvy Population:

Oman has a young, growing population that is increasingly tech-savvy. The adoption of digital tools and services is rising, creating a local market for digital services and innovations.

6. Focus on Smart Cities and IoT:

Oman is exploring the potential of smart cities and Internet of Things (IoT) applications, particularly in sectors like logistics, energy management, and transportation, positioning itself for digital transformation.

By leveraging these natural advantages, Oman can continue to advance its sustainability and digital economy strategies, contributing to both regional and global markets.

LAND SUPPLY

Oman's abundant supply of land is indeed a significant advantage, particularly in the context of the climate and digital economies:

NATURAL ADVANTAGES IN THE CLIMATE ECONOMY

1. Large Desert Areas for Renewable Energy Projects:

Oman's vast desert landscapes provide ideal locations for large-scale solar and wind farms. These areas offer ample space for renewable energy infrastructure without competing with urban development or agriculture. This abundance of land enables Oman to develop massive renewable energy projects, such as solar photovoltaic and concentrated solar power (CSP) plants.

2. Space for Green Hydrogen Production:

The availability of large tracts of land makes Oman suitable for developing green hydrogen production facilities, which require significant space for renewable energy plants and hydrogen production units. The land also allows for future scaling up of these projects.

3. Carbon Sequestration Projects:

Oman's land resources can be utilized for afforestation and other carbon sequestration projects. Expanding forested areas or enhancing existing ecosystems can help absorb CO₂, contributing to the country's climate change mitigation efforts.



NATURAL ADVANTAGES IN THE DIGITAL ECONOMY

1. Data Centers and Tech Infrastructure:

The availability of land makes Oman an attractive location for large-scale data centers and tech parks. These facilities require significant space for server farms, cooling systems, and energy infrastructure, all of which Oman can provide due to its land availability.

2. Smart City Developments:

Oman's abundant land also provides opportunities for developing smart cities that integrate digital technologies for sustainability, efficient energy management, and improved urban living standards. These developments align with the country's vision of building a tech-driven, sustainable economy.

The combination of vast land resources with favorable climate conditions enhances Oman's potential to lead in both renewable energy production and digital infrastructure development.



ELECTRICITY SUPPLY

Oman's available electricity supply and reasonable prices are key advantages that contribute significantly to both the climate and digital economies:

NATURAL ADVANTAGES IN THE CLIMATE ECONOMY

1. Reliable Electricity Grid:

Oman has developed a robust and reliable electricity grid, which is crucial for supporting renewable energy integration. The country is expanding its grid capacity to accommodate growing renewable energy projects like solar and wind farms. This reliable grid infrastructure supports the scaling of renewable energy and future clean energy exports, such as green hydrogen.

2. Reasonably Priced Electricity:

Competitive electricity prices are an essential factor in attracting investments in energy-intensive industries, including renewable energy production. Affordable electricity costs enable Oman to produce clean energy at a lower cost, increasing the competitiveness of its renewable energy exports.

3. Natural Gas-Powered Electricity Generation:

Oman continues to generate a significant portion of its electricity from natural gas, which is relatively cost-effective due to the country's domestic gas reserves. This affordable energy source acts as a bridge to support the gradual transition toward renewables, without causing a dramatic spike in electricity costs.



NATURAL ADVANTAGES IN THE DIGITAL ECONOMY

1. Cost-Effective Electricity for Data Centers:

One of the most significant expenses in running data centers is electricity, particularly for cooling and powering servers. Oman's reasonably priced electricity provides a competitive edge in attracting data center investments. The availability of affordable electricity can reduce operational costs, making Oman an attractive location for global data service providers.

2. Electricity for Digital Infrastructure:

As Oman continues to expand its digital infrastructure—such as fiber-optic networks, cloud services, and smart city technologies—the availability of low-cost and reliable electricity supports the deployment of power-hungry technologies like artificial intelligence (AI), machine learning, and the Internet of Things (IoT).

3. Potential for Energy-Efficient Innovations:

Oman's combination of reasonably priced electricity and a focus on renewable energy sources positions it to innovate in energy-efficient technologies, particularly for digital industries. The country can capitalize on energy-efficient cooling systems, green data centers, and other innovations that align with its climate goals.

Oman's available and reasonably priced electricity is a critical enabler for developing renewable energy projects, attracting data centers, and supporting the broader digital economy while ensuring sustainability.



INDIAN OCEAN COASTLINE

Oman's vast coastline along the Indian Ocean provides additional strategic advantages in both the climate and digital economies:

NATURAL ADVANTAGES IN THE CLIMATE ECONOMY

1. Prime Location for Green Hydrogen and Renewable Energy Export:

Oman's extensive coastline provides direct access to major international shipping routes in the Indian Ocean, enabling efficient export of clean energy products like green hydrogen, ammonia, and renewable electricity to global markets, particularly in Asia and Europe.

2. Offshore Wind Energy Potential:

The Indian Ocean's coastal winds present opportunities for offshore wind energy projects. This, combined with Oman's onshore wind resources, further strengthens its renewable energy profile.

3. Blue Economy Initiatives:

Oman's coastline supports initiatives in the blue economy, such as ocean-based carbon sequestration, sustainable fishing, and aquaculture, which can contribute to climate resilience while preserving marine ecosystems.



NATURAL ADVANTAGES IN THE DIGITAL ECONOMY

1. Global Data Connectivity:

Oman's coastline is home to several international submarine communication cables, making it a critical hub for global data traffic. These cables provide high-speed, low-latency connectivity to Europe, Asia, and Africa, facilitating the growth of Oman's digital economy through cloud services and data centers.

2. Strategic Location for Smart Ports:

Oman's coastal infrastructure supports the development of smart ports and logistics hubs, integrating digital technologies for efficient energy management, real-time tracking, and automated operations, further driving the digital transformation in trade and shipping.

Oman's coastline significantly enhances its prospects in both clean energy production and digital infrastructure, cementing its strategic importance in global energy and data markets.



ECO-TOURISM

The outlook for eco-tourism in Oman is highly promising, with the country's natural landscapes, commitment to sustainability, and growing global interest in environmentally responsible travel positioning it as an attractive destination for eco-conscious tourists.

Key factors contributing to this positive outlook include:

1. Rich Natural Landscapes:

Oman's diverse ecosystems, from the vast deserts of Wahiba Sands and majestic mountains like Jebel Akhdar, to its pristine coastlines along the Indian Ocean, provide ideal settings for eco-tourism. Visitors are drawn to Oman's untouched beaches, scenic wadis, nature reserves, and wildlife such as the Arabian Oryx, turtles, and dolphins.

2. Sustainable Tourism Initiatives:

Oman has been investing in developing eco-friendly tourism infrastructure, including eco-lodges, sustainable resorts, and protected natural areas. The country's emphasis on preserving its natural and cultural heritage ensures minimal environmental impact while offering authentic experiences to visitors.

3. Protected Areas and Wildlife Reserves:

Oman has established several national parks and wildlife reserves, such as the Ras Al Jinz Turtle Reserve and the Dimaniyat Islands, which are popular for nature lovers and eco-tourists. These areas promote biodiversity conservation while offering eco-friendly recreational activities like snorkeling, diving, and birdwatching.



4. Government Support and Vision 2040:

Under its Vision 2040 strategy, Oman aims to diversify its economy by promoting sustainable sectors like tourism. The government's focus on balancing tourism growth with environmental conservation supports eco-tourism development. Policies favor sustainable tourism models that protect Oman's environment while boosting its tourism economy.

5. Adventure and Cultural Tourism:

Eco-tourism in Oman extends beyond nature conservation. Visitors can experience local culture, traditions, and Bedouin lifestyles, participate in low-impact adventure activities like hiking, canyoning, and camping, and explore ancient historical sites that blend eco-conscious travel with cultural education.

CHALLENGES

Despite the potential, challenges such as managing the environmental impact of increasing tourist numbers and maintaining sustainable practices across the tourism sector must be addressed. Ensuring that eco-tourism initiatives align with the preservation of Oman's natural habitats will be key to long-term success.

Oman's commitment to sustainability, coupled with its unique natural assets and cultural heritage, positions the country for strong growth in eco-tourism. With continued investment in eco-friendly infrastructure and conservation, Oman has the potential to become a top destination for travelers seeking environmentally responsible and nature-focused experiences.



BIOCHAR

The outlook for biochar in Oman is increasingly positive, given the growing global emphasis on sustainable agricultural practices, carbon sequestration, and soil health improvement. Oman's natural environment and commitment to sustainability provide an opportunity to explore biochar production and application, particularly in agriculture and environmental conservation.

Key factors contributing to this positive outlook include:

1. Agricultural Benefits:

- **Soil Improvement:** Oman's arid and semi-arid regions face challenges with soil fertility and water retention. Biochar, which enhances soil structure, increases nutrient retention, and improves water-holding capacity, could be highly beneficial for Omani agriculture. This is especially relevant as the country seeks to boost food security through sustainable agricultural practices in line with its Vision 2040.
- **Water Conservation:** Given Oman's water scarcity issues, biochar's ability to improve water retention in soil can play a critical role in reducing the need for irrigation. This is particularly valuable in the context of Oman's efforts to conserve water in agriculture and reduce dependence on water-intensive farming methods.

2. Carbon Sequestration Potential:

- **Climate Mitigation:** Biochar acts as a stable form of carbon storage, sequestering carbon for centuries when applied to soil. As Oman seeks to contribute to global climate goals and mitigate its carbon footprint, biochar production could support carbon sequestration efforts, aligning with the country's renewable energy and environmental sustainability strategies.
- **Circular Economy Opportunities:** Oman has abundant organic waste from agriculture, forestry, and municipal sources, which can be converted into biochar. This promotes waste recycling and supports Oman's transition to a circular economy by utilizing biomass resources that would otherwise go to waste.

3. Renewable Energy Integration:

- **Biochar Co-production with Bioenergy:** Oman's focus on renewable energy, particularly solar and wind, could be complemented by bioenergy initiatives that include biochar as a byproduct. The country could explore biomass energy generation from organic waste, using biochar as a co-benefit for soil health and carbon sequestration.

4. Land Rehabilitation and Desertification Control:

- **Combating Desertification:** Given Oman's susceptibility to desertification, biochar can be used in land restoration projects to improve soil quality and increase vegetation cover. This is particularly valuable in degraded lands where conventional farming practices are challenging. Biochar can aid in the regeneration of marginal lands and promote sustainable land management.

5. Economic and Research Opportunities:

- **Local Production Potential:** Oman has the potential to develop a local biochar industry by utilizing agricultural and forestry residues. This could create new economic opportunities in sustainable agriculture and environmental technology.
- **Research and Development:** Omani universities and research institutions could play a key role in advancing biochar technologies, studying its impacts on local soils, crops, and ecosystems, and optimizing biochar production methods suited to the country's climate and resources.



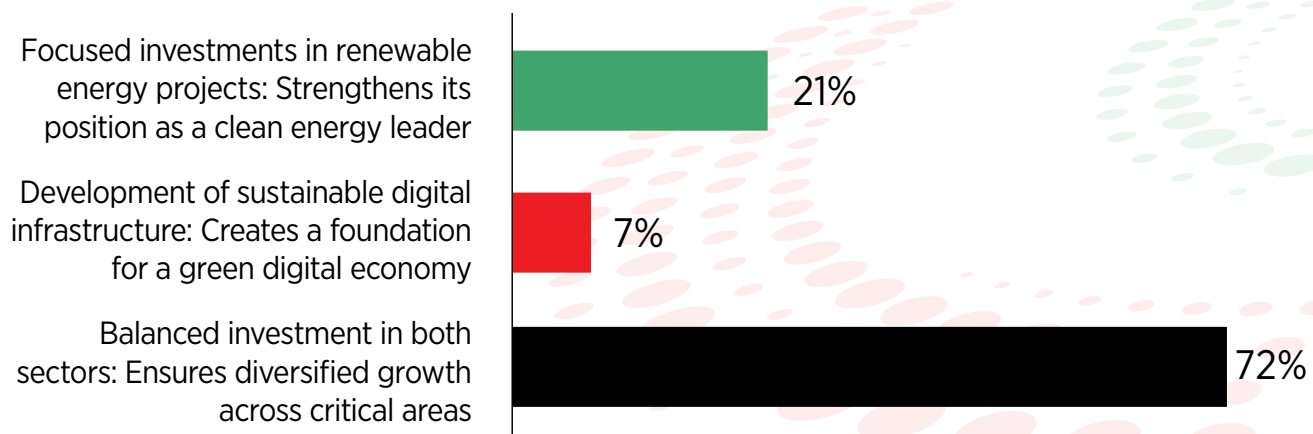
CHALLENGES

- **Awareness and Adoption:** One of the key challenges for biochar's success in Oman is raising awareness among farmers and policymakers about its benefits. Moreover, the initial cost of setting up biochar production facilities and ensuring consistent quality control could slow down adoption.
- **Scalability:** Scaling biochar production in Oman would require investment in technology and infrastructure to convert organic waste into biochar efficiently. Ensuring that biochar can be produced at a commercial scale without causing unintended environmental harm is another consideration.

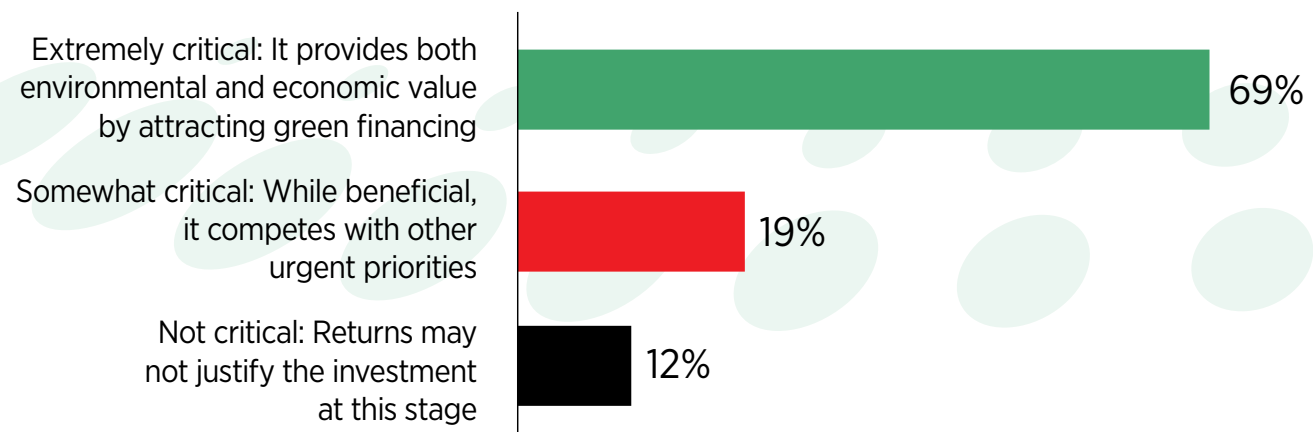
The outlook for biochar in Oman is promising, particularly in the context of sustainable agriculture, water conservation, carbon sequestration, and desertification control. With the right investments in technology, research, and education, Oman can harness biochar to address both environmental challenges and agricultural productivity while contributing to its long-term sustainability goals.

INDUSTRY SURVEY

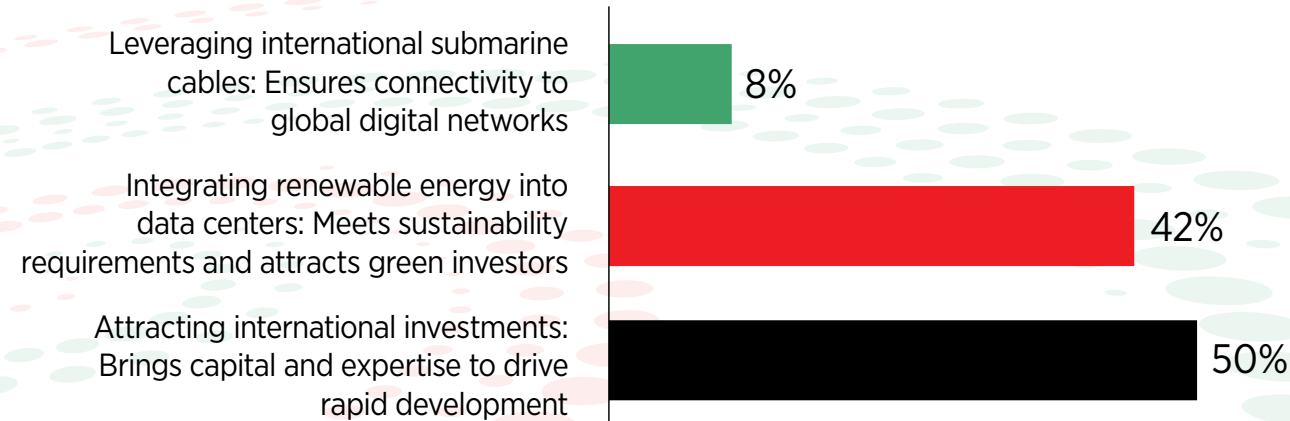
What should Oman prioritize to enhance its global role in the climate and digital economies while ensuring long-term economic and environmental sustainability?



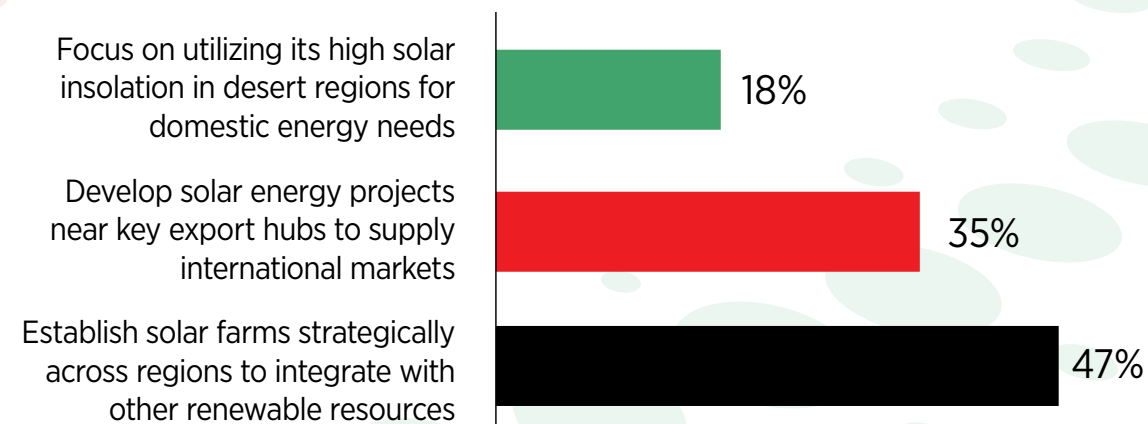
How critical is it for Oman to invest in enhancing its blue carbon assets, such as mangroves and seagrasses, to protect biodiversity and meet international carbon offset commitments?



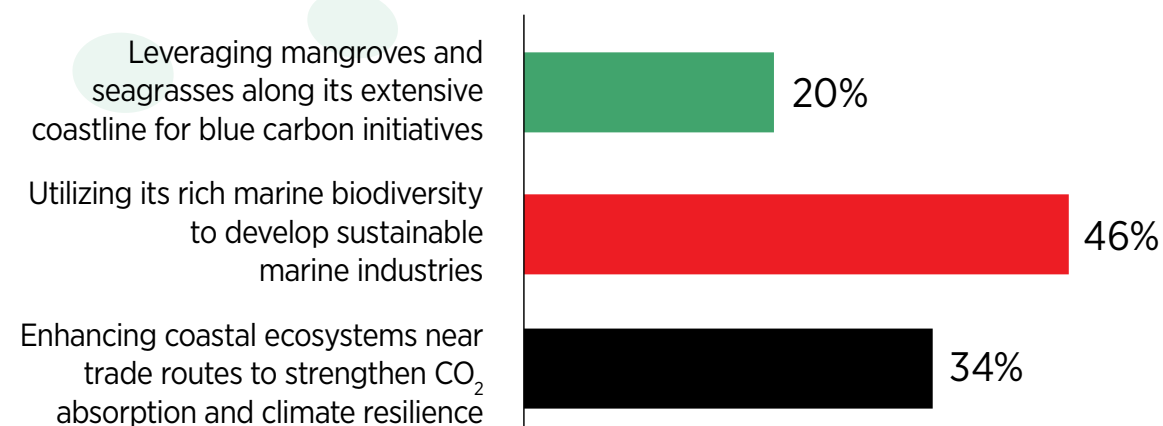
What is the most important factor for Oman to become a global hub for digital infrastructure, given the competition for international tech investments?



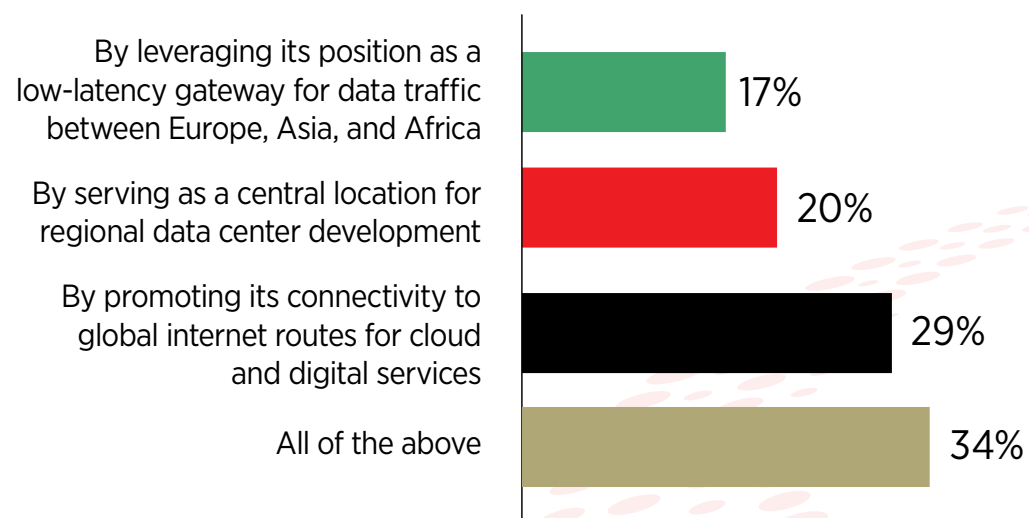
How can Oman's geographic location best support the development of its abundant solar energy resources?



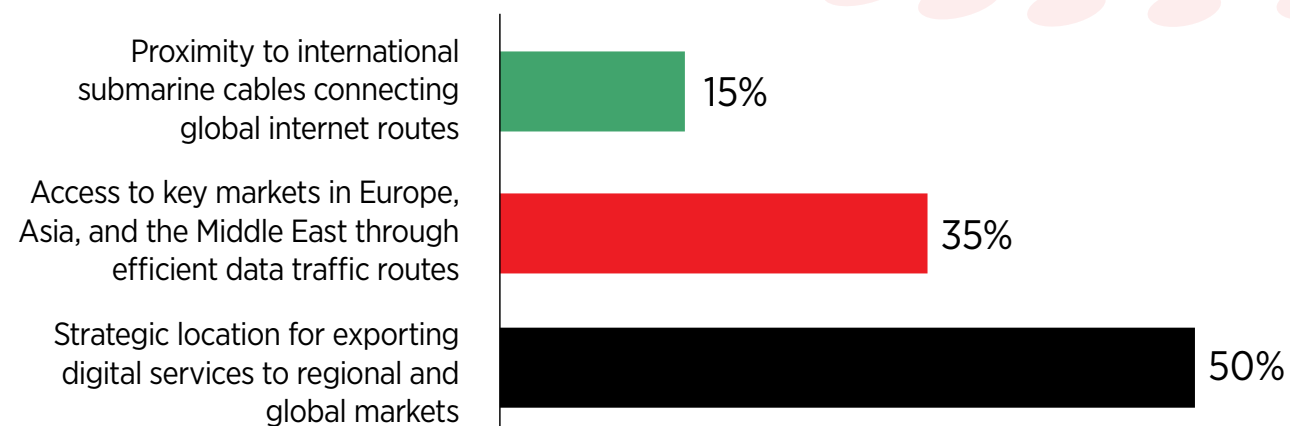
Which underutilized geographic marine asset should Oman focus on to align with global climate mitigation goals?



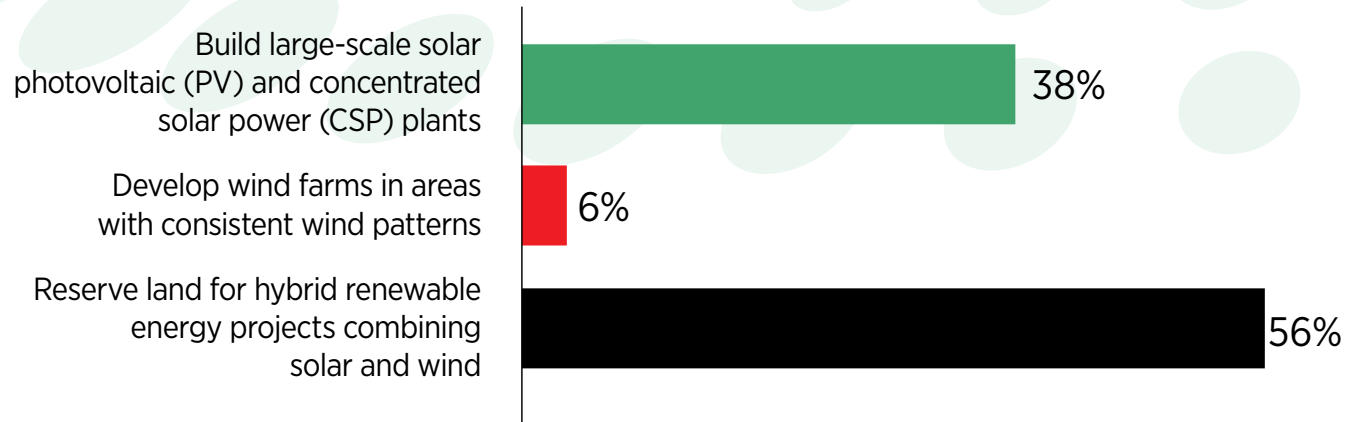
How can Oman's strategic geographic location best support its ambition to become a digital hub?



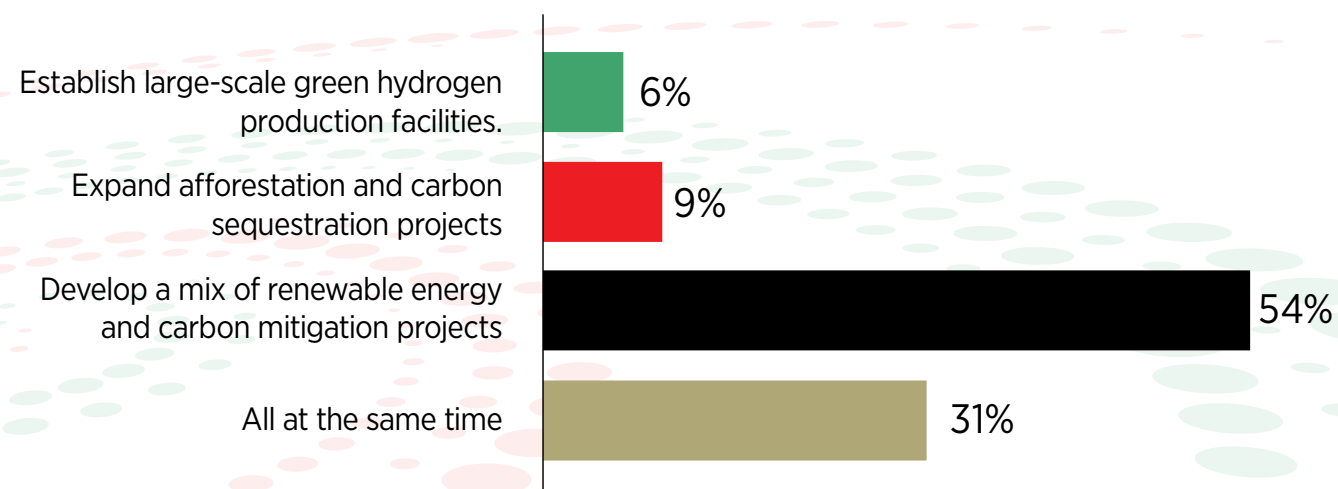
Which geographic advantage should Oman focus on to attract international investment in its digital economy?



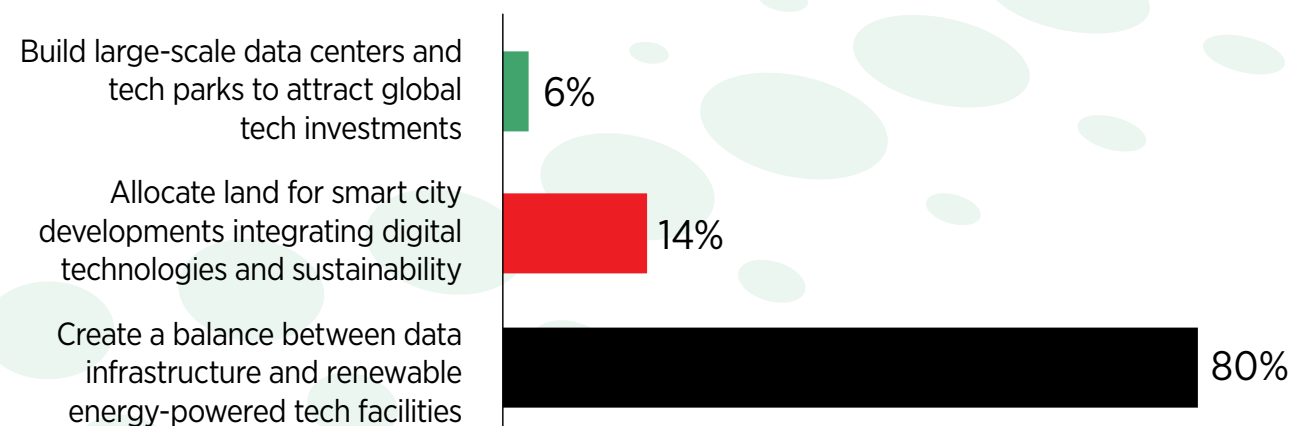
What is the most effective way to utilize Oman's vast desert landscapes for renewable energy development?



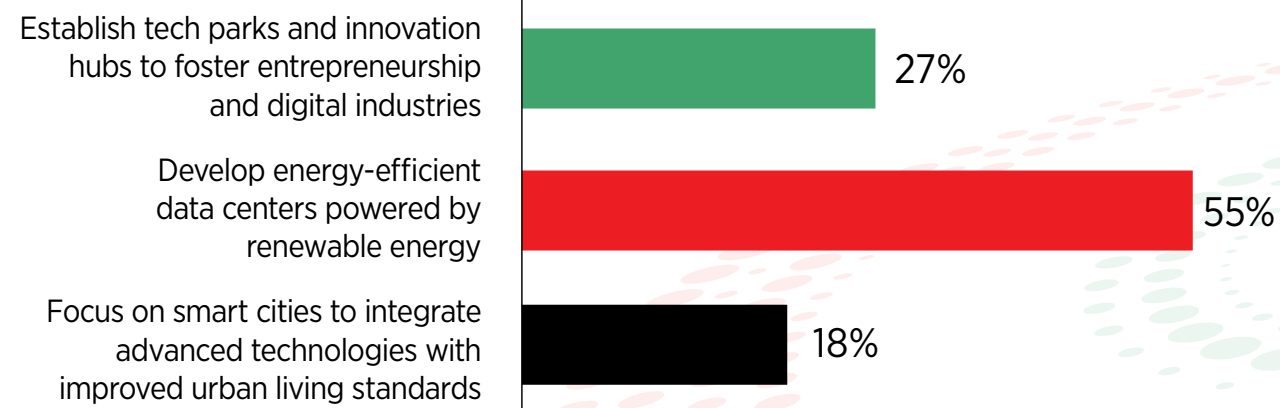
How should Oman's abundant land resources be prioritized for future climate-related initiatives?



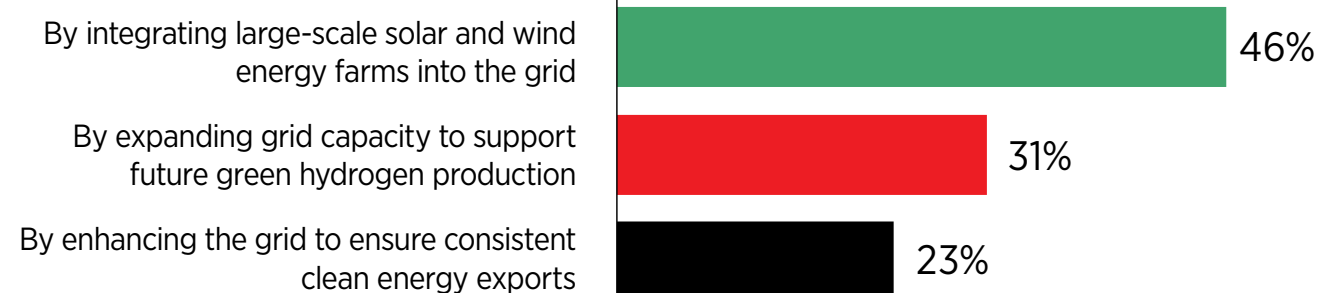
How should Oman prioritize its land resources to support the development of its digital economy?



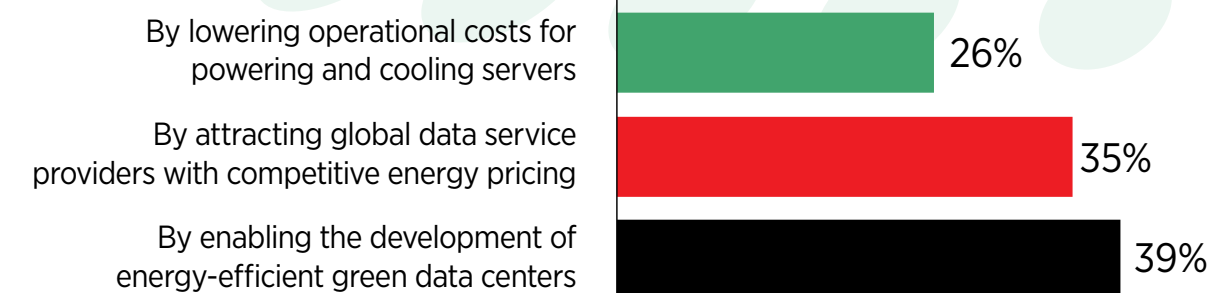
What is the most strategic use of Oman's abundant land for advancing digital infrastructure?



How can Oman's reliable electricity grid best support the expansion of its renewable energy projects?



How can Oman's reasonably priced electricity best support the growth of data center investments?



The Oman CCED

STUDENT AWARDS 2016-2024

for the Advancement of Post-Graduate Education



WINNER 2024 - MASTERS DEGREE



Elham Khalfan Said Alnadabi

Elham Khalfan Said Alnadabi, a young and passionate Omani geologist specializing in Petroleum Geoscience, a PhD student in the Department of Earth Science at Sultan Qaboos University. Worked on exciting and comprehensive projects such as using remote sensing to detect oil leaks and studying ancient rock formations from field scale to microscopic scale. Leading my team to win first place in IBA 2019 competition for Middle East was a proud moment that strengthened my leadership and teamwork skills. Through all these experiences, I am dedicated to using my knowledge to support Oman's Vision 2040 and improve our energy strategies. My passion goes beyond research—I want to turn my work into real solutions that help our country grow. I'm deeply honored that I've been awarded The CCED Oman Students award. This achievement wouldn't only help me further my involvement in important projects but also allow me to inspire other young Omani researchers. I am excited to continue working with experts and contribute to Oman's future as a leader in sustainable energy solutions.

WINNER 2024 - MASTERS DEGREE



Eng. Abdulmajeed Alwahaibi

Eng. Abdulmajeed Alwahaibi holds a BSc in Mechanical Engineering from Colorado State University, USA, an MSc in Petroleum and Natural Gas Engineering from Sultan Qaboos University, Oman, and an MSc in Advanced Mechanical Engineering from the University of Leeds, UK. He has gained extensive experience through roles and internships with various engineering consultancies and oil & gas operators, serving as a maintenance, operations, and pipeline engineer. Currently, Abdulmajeed is a Lecturer in the Mechanical and Industrial Engineering Department at the University of Technology and Applied Sciences in Muscat. He has authored several publications focusing on corrosion control, renewable energy, green hydrogen, and the application of artificial intelligence techniques in the petroleum and gas industry. His ongoing research centers on energy solutions and the integrity of oil & gas materials, with plans to pursue a PhD in these areas.

***The Student Award Winners are offered a three-month paid Graduate Student Internship at CCED to garner critical industry experience.**

The Oman CCED

STUDENT AWARDS 2016-2024

for the Advancement of Post-Graduate Education



SELECTION COMMITTEE MEMBERS 2024



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Development and Planning Manager
CC Energy Development (CCED)



Omar Al Mamari
Exploration Director
CC Energy Development (CCED)



Saif Al-Bahry
Former Professor and Member of the Department of Biology
Sultan Qaboos University (SQU)



Dr. Zeinab Zohny
Founder and CEO
ZeNN ai



Dr. Eng. Najah Al Mhanna
Department of Engineering
German University of Technology
Oman (GUtech)

VISION AND IMPACT

The vision of the Oman Student Awards for the advancement of post-graduate education 2024 is to enhance the prestige and attitudes toward research-focused education as a major component to building knowledge capacity and talent. Both are required to deliver an innovative R&D ecosystem in Oman.

The Oman Student Awards recognize and celebrate the country's future industry and academic leaders who will contribute to building the sultanate's R&D hub. This Pioneering Award recognizes role models and establishes the award winners as ambassadors for the Advancement of Post-Graduate Education in Oman.

As the project gains visibility and legitimacy, so does the significant role of post-graduate education in the development of a knowledge economy.

