



Oman's Journey to Net Zero

An Environment for Enterprise?



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سلطنة عُمان
وزارة التجارة والصناعة وترويج الاستثمار
Ministry of Commerce, Industry & Investment Promotion





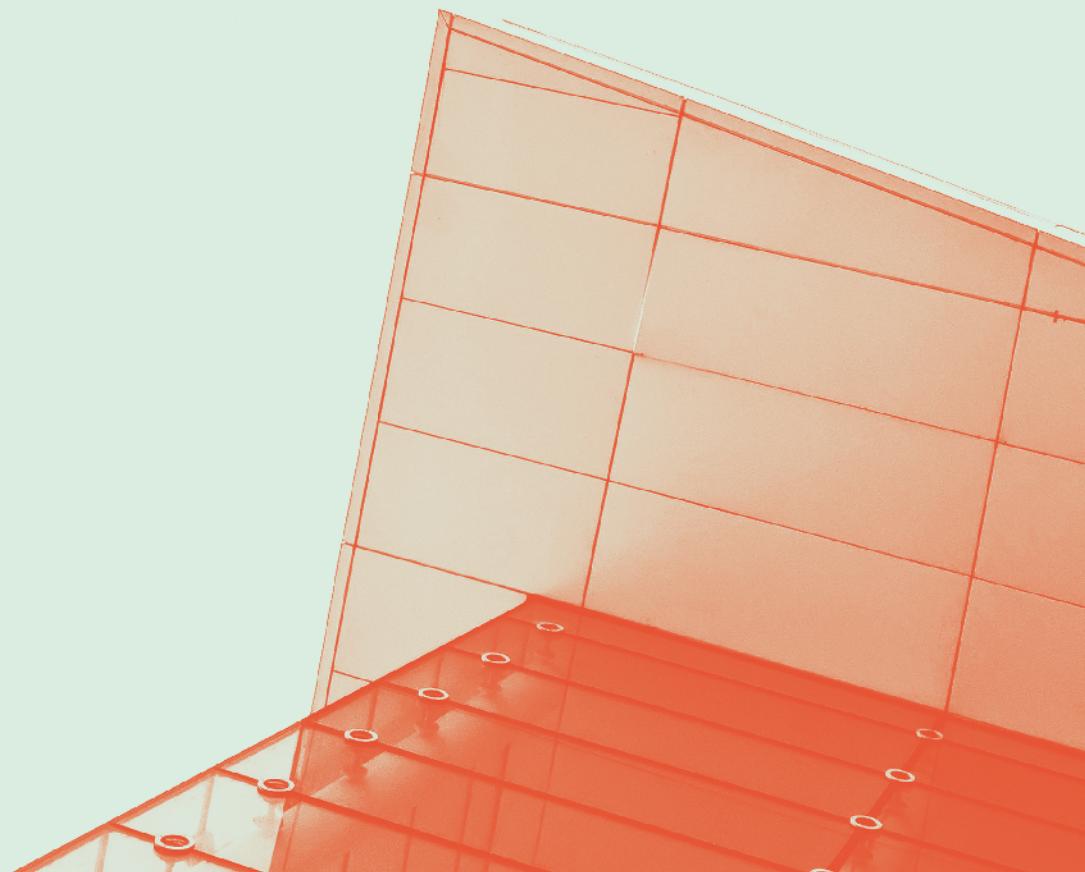
**OMAN'S NET ZERO
STRATEGY, SKILLED
WORKFORCE,
FAVOURABLE WIND
AND SOLAR CONDITIONS,
STRATEGIC LOCATION
AND SUPPORTIVE
REGULATIONS MAKE IT
A COMPELLING GLOBAL
INVESTMENT HUB FOR
SUSTAINABLE INITIATIVES.**

HE IBTISAM AL FAROUJI

Undersecretary, Investment Promotion

Ministry of Commerce, Industry & Investment Promotion

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About Tejarah Talks

Tejarah Talks is organized by Oman Business Forum in association with the Ministry of Commerce, Industry & Investment Promotion. With a firm focus on Oman's current and future business, export and investment environment, Tejarah Talks is a series of informal, interactive evening discussions that brings together some of Oman's most inspirational and innovative thinkers and doers to share their stories, insights and ideas with an enthusiastic crowd. It is a platform for positive interaction.



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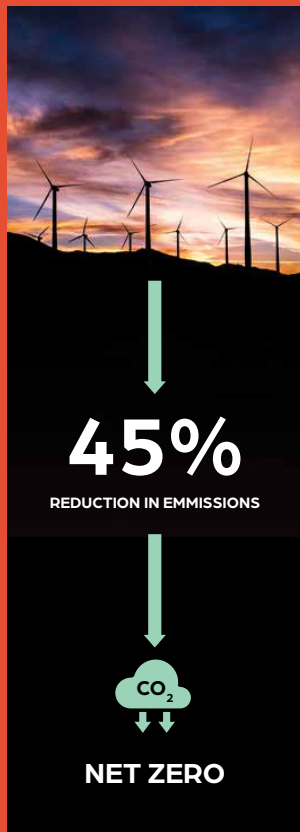


Hilal Al Ghaithi
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Tejarah Talks 'Oman's Journey to Net Zero: An Environment for Enterprise?' 17 May was moderated by His Highness Sayyid Dr. Adham Al Said, Managing Partner, The Firm. The panellists were Walter Simpson, Managing Director, CC Energy Development; Ammar Al Kharusi, Group Head of Development, OMRAN Group; Fadi Al Shihabi, KPMG Partner & ESG Services Lead; and Hilal Al Ghaithi, Director, Energy, Authority for Public Services Regulation.

What's Net Zero?

Put simply, net zero means cutting greenhouse gas (GHG) emissions to as close to zero as possible, with any remaining emissions re-absorbed from the atmosphere, by oceans and forests. Science shows clearly that in order to avert the worst impacts of climate change and preserve a liveable planet, global temperature increase needs to be limited to 1.5°C above pre-industrial levels. Currently, the Earth is already about 1.1°C warmer than it was in the late 1800s and emissions continue to rise. To keep global warming to no more than 1.5°C – as called for in the Paris Agreement – emissions need to be reduced by 45% by 2030 and reach net zero by 2050.



How Can Net Zero Be Achieved?

Transitioning to a net zero world is one of the greatest challenges humankind has faced. It calls for nothing less than a complete transformation of how we produce, consume and move about. The energy sector is the source of around three-quarters of GHG emissions today and holds the key to averting the worst effects of climate change. Replacing polluting coal, gas and oil-fired power with energy from renewable sources, such as wind and solar, would dramatically reduce carbon emissions.

What's the Timeframe?

Recent research from the Intergovernmental Panel on Climate Change (IPCC) suggests limiting warming to 1.5 degrees C depends on CO₂ emissions reaching net zero between 2050 and 2060. Reaching net zero earlier in that range avoids a risk of temporarily overshooting 1.5 degrees C.¹ Critically, the sooner emissions peak and the lower they are at that point, the more realistic achieving net zero becomes. This would also create less reliance on carbon removal in the second half of the century.² This does not suggest that all countries need to reach net zero emissions at the same time.

However, the chances of limiting warming to 1.5 degrees C depend significantly on how soon the highest emitters reach net zero. Equity-related considerations – including responsibility for past emissions, equality in per-capita emissions and capacity to act – also suggest earlier dates for wealthier, higher-emitting countries. Importantly, the timeframe for reaching net zero emissions is different for CO₂ alone versus for CO₂ plus other GHGs like methane, nitrous oxide and fluorinated gases. For non-CO₂ emissions, the net zero date is later, in part because models assume that some of these emissions – such as methane from agricultural sources – are more difficult to phase out. However, these potent but short-lived gases will drive temperatures higher in the near-term, potentially pushing temperature change past the 1.5 degrees C threshold much earlier.³

Because of this, it is important for countries to specify whether their net zero targets cover CO₂ only or all GHGs. A comprehensive net zero emissions target would include all GHGs, ensuring that non-CO₂ gases are also reduced with urgency.



Emissions, such as methane from agriculture, are more difficult to phase out

COP28: Building Momentum

As we prepare for COP28 (30 November – 12 December 2023) in Dubai, global momentum for setting net zero targets has accelerated. As of November 2022, around 140 countries, including the Sultanate of Oman, have announced or are considering net zero targets, covering close to 90% of global emissions compared to 130 countries, covering about 70% emissions, in May 2021.⁴ And as of September 2022, 11,309 non-state actors including 8,307 companies, 595 financial institutions, 1,136 cities, 52 states and regions, 1,125 educational institutions and 65 healthcare institutions had joined the UN's Race to Zero – the largest ever alliance committed to achieving net zero carbon emissions by 2050 at the latest.⁵

**COP²⁸**
UAE

Temperature rise by the end of the century

2.8°C**Is The World on Track?**

Sadly, no. Despite the enormous benefits of climate action to date, progress is happening too slowly for the world to hold temperature rise to 1.5 degrees C.⁶ The UN finds that climate policies currently in place point to a 2.8 degrees C temperature rise by the end of the century.⁷



Green Opportunities

Getting to net zero will require rapid change and large-scale technology deployment across multiple industries – a transition that will create opportunities to build entirely new businesses.

Research has found that reaching net zero by 2050 could entail a 60% increase in capital spending on physical assets, compared with current levels. The required investments amount to US\$9.2 trillion per year until 2050, of which US\$6.5 trillion annually would go into low-emissions assets and enabling infrastructure.⁸

The research also shows that growing demand for net zero offering could generate more than US\$12 trillion of annual sales by 2030 across 11 value pools, including transport (US\$2.3 trillion to US\$2.7 trillion per year), power (US\$1.0 trillion to US\$1.5 trillion) and hydrogen (US\$650 billion to US\$850 billion).⁹ Such a transformation of the global economy could create significant growth potential for climate technologies and solutions.¹⁰

Addressable Market Size 2030

\$ Billions



The required investments amount to US\$9.2 trillion per year until 2050

Building green businesses is top of mind for many leaders. In McKinsey's State of New Business Building report, 92% of executives say that new businesses built in the next five years will address sustainability to some extent – and 42% expect to put sustainability at the centre of their new businesses' value proposition.¹¹

Green Jobs

Jobs that have a direct, positive impact on the planet traditionally involve renewable energy, electric transport, energy efficiency or nature conservation. But right now, as more sectors transition to low-carbon models, every job has the potential to become "green".

Dele ut Facias

According to the International Labour Organization (ILO) the transition to the green economy will inevitably involve destruction of some jobs, but at the same time, create new ones. The ILO estimates that about 100 million new jobs can potentially be created by 2030, leading to a net job creation of 25 million jobs.¹² But what do we mean by "green economy"? The definition is broad, according to the United Nations Environment Program, the green economy concerns all economic activities that lead to "an improvement in human well-being and social equity while reducing significantly environmental risks and the scarcity of resources."¹³ Thus, it consists of six main sectors:

1

Renewable
Energy

2

Green
Building

3

Means of
Transport

4

Water
Management

5

Waste
Management

6

Spatial
Planning

The renewable energy sector is already a major global employer. A report from the International Renewable Energy Agency states there are 12.7 million jobs in renewable with solar energy leading the way with 4.3 million jobs worldwide. New clean energy projects also drive employment in other sectors, such as workers employed to build and deploy new solar plants, wellheads, heat pumps and more.¹⁴

The outlook looks even more promising. The IEA estimates that 14 million new clean energy jobs will be created by 2030 with another 16 million workers switching to new roles related to clean energy.¹⁵ It is therefore no surprise that wind turbine technicians (up 44%) and solar panel installers (up 27%) are predicted to be among the fastest growing occupations in the US between now and 2031.¹⁶



IRENA

The International Renewable Energy Agency states there are 12.7 million jobs in renewable with solar energy leading the way with 4.3 million jobs worldwide

Eco-builders

The construction industry remains a major cause of pollution. According to the World Green Building Council, buildings are responsible for 39% of global energy-related carbon emissions.¹⁷ However, there is a solid foundation for optimism. The increasing use of natural and environmentally friendly materials and modern methods of construction – backed by new legislation – can reduce overall emissions by improving building energy performance and decreasing building materials' carbon footprint.

Inside the buildings of tomorrow, smart technology will help people use cooling, heat, light and other resources more efficiently. Building Oman's greener homes and offices of the future – and retrofitting old ones to meet modern standards – is a huge undertaking requiring hundreds of specialist roles. The ILO predicts that there will be 6.5 million jobs in sustainable construction by 2030, making it the second-fastest growth sector behind clean energy.¹⁸



Kate Raworth
University of Oxford's
Environmental Change Institute

Reuse, Repair, Remake

Economist Kate Raworth from the University of Oxford's Environmental Change Institute, believes we need a decarbonised economy far sooner than 2050. According to Raworth, the economy should urgently be redesigned so that resources are not wasted. That, she says, requires serious innovation: "Our future economy will thrive on reusing, repairing, refurbishing, remaking and repurposing – this transformation will create new kinds of creative and purposeful jobs."¹⁹

The new circular economy includes both conventional recycling, which reuses raw materials and more creative careers in upcycling, such as sustainable fashion and furniture designers who make new products from waste. The ILO predicts that 6 million jobs can be created by moving away from an extract-manufacture-use-discard model and embracing recycling, reuse and repair with an emphasis on waste management (recycling) and services (repair, rent).

People Power

It is clear that the policies required to meet Oman's 2050 net zero target will need action much more directly from people, and not solely by the government and businesses. This means that the changes required will be much more visible in people's everyday consumption choices, ranging from how they travel to the products they buy. This will call for complex and in some cases, costly changes and the right type of support. It would be all too easy to dispute or delay the need for action – but that is no longer an option given the urgency and gravity of the issue.



Change in Behaviour

There is clear interest among Omani consumers and businesses about what they can do to protect the environment, but also some confusion about what actions they should take to make a difference. Directing public interest to more effective action needs to be a key part of the transition to net zero. Behaviour that can reinforce and shift the market outlook are particularly important, where consumers use their buying power to support growth in greener products and services.



Show Me The Way

A potential solution is to create a central, easy-to-use and tailored information hub to inform people on what they can do and how to reduce their carbon footprints. Consumers want to act, but most do not know what steps would make the biggest difference or how to take them. In this regard, a clear ranking of actions, helpful tips and guides that highlight the benefits such as reduced energy bills and improved health would be enormously helpful.

SMEs & Net Zero

SMEs and entrepreneurs may have a relatively small individual environmental footprint, but in aggregate terms, they account for a significant share of environmental pollution and GHG emissions. Estimates on a European level indicate that SMEs account for 40 – 64% of industrial waste and 50 – 70% of GHG emissions of the business sector. If they do not reduce emissions, there is no net zero economy, but SMEs are largely struggling to start their transition to net zero.²⁰

AS ENTREPRENEURS AND INNOVATORS, SMES ARE CRITICAL FOR DEVELOPING SOLUTIONS TO ADDRESS THE GLOBAL CLIMATE CRISIS AND THE BUILDING OF GREEN ECONOMIES – CURRENTLY THEY ACCOUNT FOR 70 – 90% OF CLEAN TECH FIRMS AND OVER A THIRD OF SMES OFFER GREEN PRODUCTS AND SERVICES.²¹

There are various drivers for SMEs to green their business models. Reduction of operating costs, personal conviction, improvement of brand image and regulatory requirements are some of the key factors often cited. Going forward, value chains will likely play a major role in driving SME green investments. However, while many Omani SMEs and entrepreneurs recognise that the transition to net zero is a

must and are taking actions towards greening, their efforts remain relatively modest so far. Most Omani enterprises are at the beginning of their journey towards net zero and actions are often limited to basic interventions, such as energy efficiency measures and waste reduction. More complex interventions, such as production or service process redesign, upstream and downstream supply engagement and external environmental auditing, are broadly lacking.

Omani SME progress in the green transition depends on several factors, such as the sector in which the business operates, their size, emissions levels and their perceptions around the business case. For example, manufacturers face a longer and more complex journey compared to service SMEs. Companies with higher emissions levels tend to take more actions to reduce them, as do larger companies. In fact, the most proactive companies see greening efforts as an opportunity to improve their business. Understanding these factors and how they interact can help Omani policymakers and financial institutions create better targeted policy and financial solutions.

Net Zero Challenges

Clearly, there is no net zero economy without Omani SMEs transitioning to net zero aligned operations. However, they face challenges that hinder their decarbonisation journey including high costs and the need for access to external finance. SMEs consider that high upfront costs and limited internal funds for investment are the most significant barriers to their green transition, along with the lack of low-cost sustainable financing solutions. SMEs are also concerned about the impact of net zero investments on their competitiveness over the near-term, including their ability to provide affordable green products, services or processes. Capacity constraints also impede SMEs from embarking on the journey to net zero.



It is important to point out that half of the estimated US\$100 trillion investment required to get global supply chains to net zero by 2050 will need to go to SMEs.²²

Supporting SME Green Transition

Government institutions, commercial and development banks and other key actors have an important role to play in supporting Omani SMEs transition to net zero by:

Providing financial support to address challenges impeding SME access to sustainable finance.

Understanding better Oman's SME, start-up, entrepreneurial eco-system its sustainable finance needs, depending on location, size, activity and ambition, in order to better tailor financing instruments.

Strengthening SME awareness of sustainability-related data, information, definitions, standards and methodologies.

Engaging in international co-operation and initiatives to foster knowledge sharing, policy dialogue and collaboration on sustainable finance for SMEs.

Equally important is providing Omani SMEs with access to non-financial support in the form of training, workshops, guides and information portals to help them better identify and measure their environmental performance and identify steps that can be taken to embark and advance their net zero transition.

Where tools are already in place, public institutions can help raise SME awareness and use of these tools. Public institutions can also develop tools internally or engage in partnerships with private initiatives or other non-governmental actors to make use of externally developed tools and services.

Be Bold

To keep up, Omani SMEs must be bold. Instead of playing defence, as many have largely done until now, business owners and managers must pivot to an offensive position, working to meet growing demand for climate-friendly goods and services, and the green energy, equipment and infrastructure needed to produce them. First movers will clearly gain an advantage.

Science Based Targets initiative (SBTi)

The Science Based Targets initiative through the SBTi Net-Zero Standard publication has provided a clear definition of net-zero and shown how businesses can achieve it.²³ Under the SBTi Net-Zero Standard, corporate net-zero is defined as:

"Reducing scope 1, 2, and 3 emissions to zero or to a residual level that is consistent with reaching net-zero emissions at the global or sector level in eligible 1.5°C-aligned pathways. Neutralising any residual emissions at the net-zero target year and any GHG emissions released into the atmosphere thereafter."

With a robust framework grounded in climate science, Omani business owners and managers can now confidently set emissions reduction targets in line with the Paris Agreement and take the climate action necessary to limit global temperature rise to 1.5°C.

Near-Term Science-Based Targets

These galvanise action and initiate change to make sure that businesses can achieve rapid and significant reductions in emissions – typically 4.2% pa – by 2030 – in line with climate science.

Long-Term Science-Based Targets

These determine how much a company must reduce their value chain emissions to align with limiting warming to 1.5°C. A company cannot claim to be net-zero until the long-term science-based target has reached 90% reduction in emissions. The deadline for long-term targets is 2050, but more ambitious companies are striving to reach net zero before this.

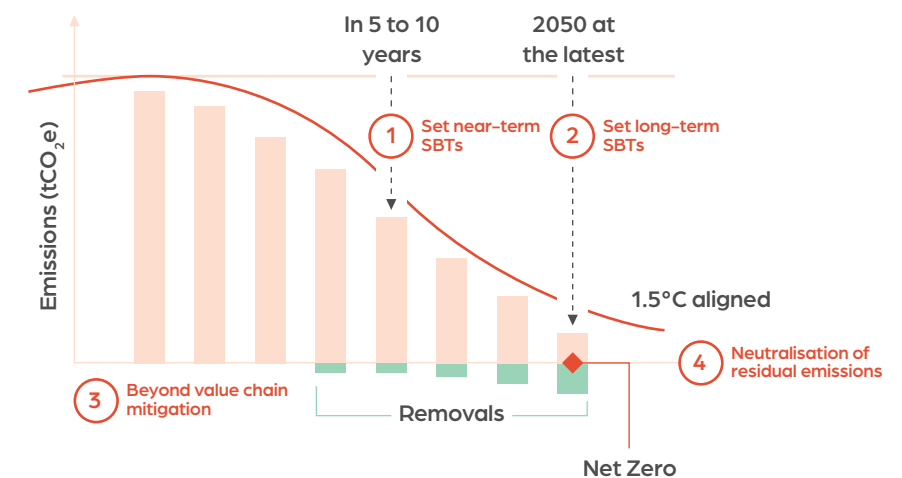
Beyond Value Chain Mitigation

The SBTi encourages companies to take action and fund projects with climate benefits beyond their value chain. This will help mitigate GHG emissions and lead to additional benefits for people and the planet in support of the UN's Sustainable Development Goals. For example, funding carbon avoidance or removal projects and nature restoration schemes. As a result of funding carbon removal or avoidance projects, a company can become 'carbon neutral'. However, this is not the end goal and emissions reduction should be prioritised.

Neutralisation

The SBTi acknowledges that it may not be possible for some industries to achieve zero emissions and decarbonise 100% of the value chain. As a result, once long-term decarbonisation targets have been reached, companies must use carbon removals to neutralise unavoidable emissions.

Key Elements of the Net Zero Standard



Green Ratings

An eco-label is a trustworthy symbol that manufacturers can put on the things they sell to demonstrate they are genuinely better for the environment than comparable products.

Most eco-labels are voluntary, for instance, canned fish producers might apply to use a label from the Marine Stewardship Council showing the tuna they catch meets its standards of sustainability, while timber producers might ask for certification by the Forest Stewardship Council to prove their wood has not come from a tropical rainforest.



Forest Stewardship Council



Marine Stewardship Council

Other eco-labels are mandatory, for example, in the US, manufacturers of cars and major household appliances are obliged to label products to show their energy efficiency, while in Europe, makers of major electrical appliances also have to display a label with an A – G rating – A is good, G is bad – showing its level of energy efficiency.

Today, there are many different eco-labelling schemes in operation around the world. For instance, the Ecolabel Index lists 456 eco-labels in 196 countries, across 25 industries²⁴ – each covering a different range of environmental criteria. Some labels are narrowly defined, for example, those that read “100% recycled” tells the consumer only that a product has been made from recycled materials, it does not guarantee the factory where the product was made produced no air pollution, used no child labour, paid its workers fairly, or did not transport its goods by environmentally damaging air freight.



Other labels seem narrowly defined but implicitly include broader standards of environmental performance. For example, organic food in the UK that is certified by the Soil Association, guarantees the consumer the food was grown without pesticides but also that any animals involved in its production were treated humanely. Some labels, including the EU Eco Label, certify good environmental performance across a much wider range of criteria, including the use of raw materials and energy, the degree of recycling and reuse and whether air, water or land pollution was produced during the manufacturing process.

Omani Eco-label

Perhaps a local eco-label covering food and clothing, supermarkets, banks, airlines and retail chains could be created to help engaged Omani consumers choose green. By extension this would incentivise Omani businesses to become more sustainable, helping local consumers buy greener products and services.

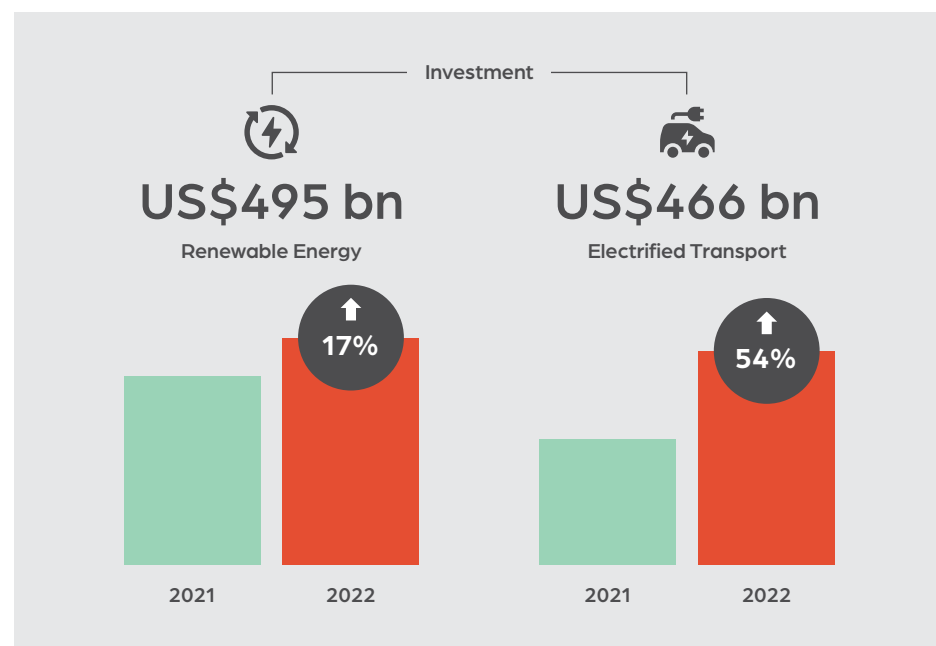
Driving Competition

Competition between firms is a strong driver of innovation. But businesses will have little incentive to out-green each other if Omani consumers cannot discern and choose the greener brand. There is the opportunity for government to remove the consumer's need to rely on dubious marketing and greenwashing, and instead provide simple, credible, green ratings on businesses and products, helping motivated Omani consumers choose greener options.



Green Investment Growing but Insufficient

A recent BloombergNEF report reveals global investment in the low-carbon energy transition totalled a record US\$1.11 trillion in 2022 – up 31% in a year. And for the first time, investment in green energy technologies – such as renewable energy, electrified transport and energy storage – has reached parity with the total capital deployed to produce new fossil fuels.²⁵



Renewable energy, which includes wind, solar, biofuels and other renewables, remained the largest sector in investment terms, achieving a new record of US\$495 billion committed in 2022, up 17% from 2021. However, electrified transport, which includes spending on electric vehicles and associated infrastructure, came close to overtaking renewables, with US\$466 billion spent in 2022 – an impressive 54% increase year-on-year.²⁶

No major industrialised country is currently scheduled to meet its goals under the Paris Agreement

Despite 2022's results, global investment in lower-carbon technologies remains woefully short of what is needed to confront climate change. For the world to get on a 2050 net zero CO2 emissions trajectory, investment must triple. Including the additional US\$274 billion invested in the power grid, energy transition investment hit US\$1.3 trillion in 2022. By comparison, the world must invest an annual average of US\$4.5 trillion for the remainder of this decade in order to get on track.²⁷ Indeed, no major industrialised country is currently scheduled to meet its goals under the Paris Agreement²⁸ and the Climate Action Tracker predicts that current policies represent a warming pathway of around 2.9°C, with disastrous implications for ecosystems, human and animal populations.²⁹

Green Hydrogen

The global hydrogen economy remains robust and growing from the project pipeline to deployment, according to an analysis of more than 1,000 projects published by the Hydrogen Council.³⁰ The report highlights strong growth across the project funnel with total investments increasing by 35% from May 2022 to January 2023. Nine percent of total investments have reached final investment decision up 30% since May 2022.



The report tracks 1,040 projects globally representing US\$320 billion in direct investment between now and 2030, up from US\$240 billion. Approximately half of the projects are focused on large-scale industrial applications, with the next largest segment (20%) related to mobility. In mobility, more than 1,000 refuelling stations are now in operation globally. Total announced electrolyzer capacity stands at 230 GW in 2030.³¹

Oman's GH2 Ambition

Oman enjoys high levels of solar irradiation – up to 2.1MWh per m² – as well as wind speeds of 9.7 metres per second on the coast – factors that will feed ambitions of producing one million tonnes of green hydrogen and its derivatives by 2030.

Hydrom, a subsidiary of Energy Development Oman signed three green hydrogen project agreements in June 2023 as it steps up the sultanate's renewable energy industry. The first project was awarded to Amnah consortium – Copenhagen infrastructure Partners, Blue Power Partners and Al Khadra Partners – the winner of Round 1 Public Auction for block Z1-01. The second project was signed with bp Oman, for block Z1-03. A third consortium comprising Oman Shell, OQ, EnerTech, Intercontinental Energy and Golden Wellspring Wealth for Trading was awarded block Z1-04.



An MoU was also signed between Hydrom and OQ Gas Networks which aims to establish collaboration on green hydrogen pipelines development. The combined investments total more than US\$20 billion.

An area estimated at 50,000 km² – 31 times the size of London – is suitable for renewable energy and green hydrogen projects in Oman. The area of each piece of land allocated for green hydrogen projects is estimated at about 320 km².

Hydrom aims to operate at least six projects in the green hydrogen sector by 2030 in the central and Dhofar governorates, producing not less than one million tonnes annually of green hydrogen, equivalent to about 10GW of electrolyser capacity and 20GW of clean energy, with an expected investment of about US\$30 billion.

On a regional note and according to Roland Berger and MENA Hydrogen Alliance a thriving green hydrogen ecosystem could create between 400,000 and 800,000 GCC jobs by 2050 – spanning the entire value chain from renewable generation for energy supply to electrolysis and subsequently storage and distribution of green hydrogen.³²

Green Building

The buildings and construction sector is highly energy-demanding and carbon-intensive, accounting for 39% of global energy-related CO2 emissions.³³ Construction and demolition is one of the heaviest and most voluminous waste sources. In many countries construction and demolition waste accounts for up to 40% of all municipal solid waste with a significant part of it ending up in landfills.³⁴

It is important to emphasize that it already makes sense to build green. According to an IFC report, green buildings command substantially higher sale premiums – up to 31% more and sell more quickly than traditional buildings. Furthermore, green buildings maintain higher occupancy rates – up to 23% higher – than conventional buildings and offer higher rental income. By consuming less water and electricity, operational costs are up to 37% lower than traditional buildings. When green features are incorporated early in the building design, the cost of green construction can range from savings of half a percent to 12% in additional costs.³⁵



Additionally, the report notes that green buildings can be a strong driver of economic growth, generating upwards of 9 million skilled jobs in both the renewables and construction sectors by 2030. Currently, green buildings account for just 8% of the construction and renovation sector, indicating a vast potential for growth.³⁶

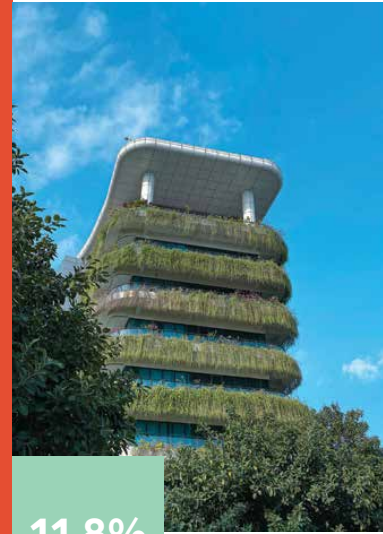
Sustainable Practices

There is a growing consensus that Oman's construction sector must accelerate its shift to sustainable practices. And green real estate development is already underway in multiple locations across the country. Yet, to fully decarbonize Oman's built environment as a system, we need to make sure that all players along the value chain collaborate and focus on the reduction of emissions. For example, material providers have a responsibility for reducing their emissions but they also need the demand for low-carbon solutions from their customers to help them invest in the transition.

Building Codes

The 2015 Paris Agreement requires all participating countries to develop a climate action plan. Across 194 'Nationally Determined Contribution' plans submitted to date, the second most frequently cited mitigation policy is improving the energy efficiency of buildings. Topping the proposed actions are building energy efficiency codes, which have already been enforced by over 80 countries and many city/state authorities. Others include incentives and market instruments as well as resilience, renovation and retrofitting measures.

The global green construction market size is expected to reach a value of more than US\$774 billion by 2030 increasing at a CAGR of more than 11.8% over the next 8 years. Much of this growth will occur in Europe, but given global growth forecasts, it is projected that new sustainable buildings alone will present a US\$24.7 trillion investment opportunity in emerging markets by 2030.



11.8%

The global green construction market size is expected to reach a value of more than US\$774 billion by 2030 increasing at a CAGR of more than 11.8% over the next 8 years

Green Construction Companies

Rapidly increasing investment in sustainable construction is creating a new ecosystem of green construction technology companies. According to GlobalData research, venture capital (VC) investment in green construction saw a significant rise in 2022, reaching US\$115m from just US\$6.9m in 2021 – signalling the sector's expected growth in the next decade.³⁷

As mentioned earlier, the World Green Building Council estimates that the energy required to construct and operate buildings accounts for around 39% of global carbon emissions.³⁸ This collective problem is the driver for the development of a green construction start-up ecosystem. Start-ups in this space are focused on varying activities, from the design and construction of low-carbon buildings to sustainable building materials companies, as well as manufacturers of prefabricated building components. In fact, the adoption of more sustainable and environmentally conscious construction materials has grown since the surge of the COVID-19 pandemic. According to research, the green building materials market is projected to reach US\$425.4 billion by 2027, growing at a CAGR of 8.6% over the analysis period 2020–27.³⁹

12 Sustainable Tools and Technologies Used in Green Construction

Solar Power



In green construction, it can be utilized in two ways, one pertains to active solar energy and another is passive solar power.

Biodegradable Materials



Limit the negative impacts on the environment as they easily breakdown without releasing toxins, eg. timber, sustainably sourced bamboo, mycelium, and organic paints.

Green Insulation



Green insulation has proven to be a sustainable construction technology as it eliminates the need for high-end finishes made from non-renewable materials.

Smart Appliances



Appliances like SmartGrid refrigerators, dishwashers, and washing machines are examples of such sustainable technologies.

Electrochromic Smart Glass



Electronic Smart Glass works mainly in summer to shut out the heat of solar radiation.

Passive House



Passive house is considered the most advanced form of green construction. It uses nomenclature or electrical devices but relies on the building design.

Cool Roofs



Cool roofs are one of the sustainable green design technologies that aim at reflecting heat and sunlight away.

Water Efficiency Technologies

The technologies encompass the re-use and application of efficient water supply systems, including the use of processes like dual plumbing, greywater re-use, rainwater harvesting, and water conservation fixtures.

Technology Efficiency

Construction of a building requires energy that release CO2 and other emissions. If this process is made more efficient, it is possible to complete more buildings in less time which significantly reduces the environmental impact per building.

Low-emitting Materials



Selecting low emitting materials and products improves human health and goes a long way in protecting the overall environment.

Self-Powered Buildings



The buildings can generate sufficient power to support their energy requirements and even direct surplus energy back into the power grid.

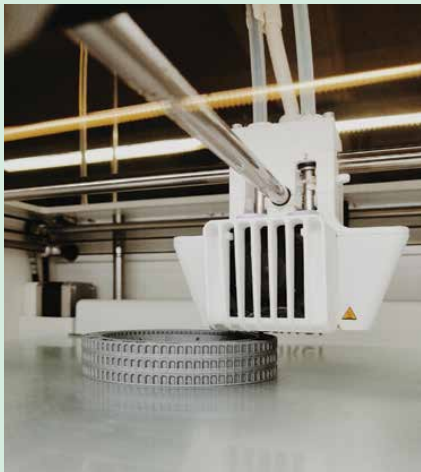
Rammed Earth Brick



Rammed earth brick is one of the ancient construction technologies which has been lately re-introduced for the demands of sustainability.

Surge in Green VC Funding

A November 2022 A/O PropTech study titled the Future of Building in a Low-Carbon World reflects this surge in VC investment, finding that low-carbon building practices attracted record levels of funding in 2022, with investment rising to US\$2.2 billion.⁴⁰ The study revealed that US\$4.5 billion of early stage capital was invested in companies directly focusing on decarbonising the architecture, engineering and construction sectors between 2017 and 2022, involving more than 452 deals. While 80% of the total investment value over that period was concentrated in North American start-ups, more than half of the deals done were in Europe.⁴¹



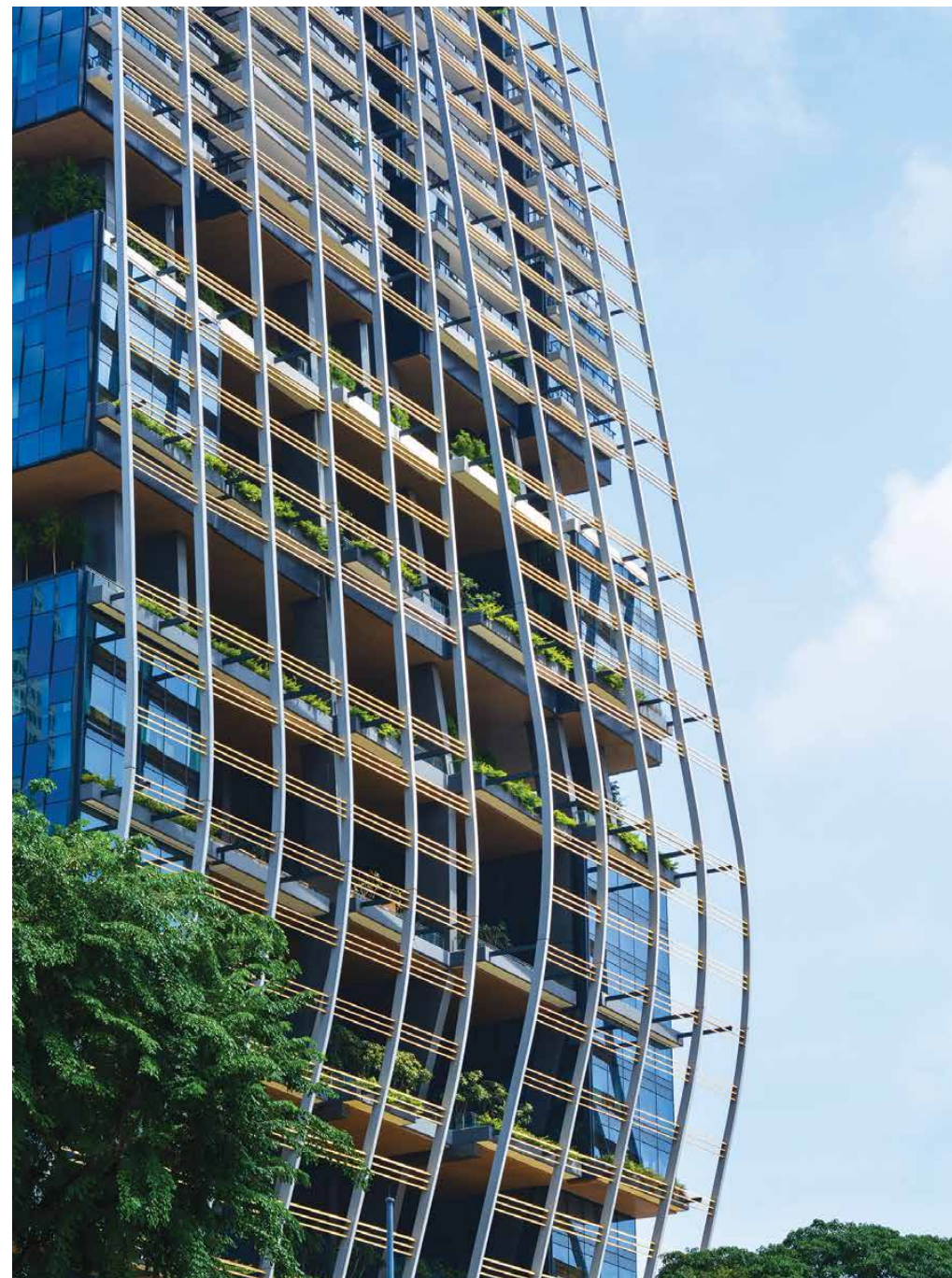
The increased investment in green construction technologies is a combination of several factors, including the use of new materials, production techniques such as 3D printing and uptake of AI to improve efficiency and reduce waste. In addition, start-ups and investors are realising the vast improvements these innovations can bring to the construction industry.



Alongside technology advances, increased global regulation in the construction industry is also driving investment. The UN 2030 Agenda for Sustainable Development has been attributed as playing an influential role in the growth of more environmentally friendly construction. And much of the sector's growth is expected to come from developing nations.

Do the Right Thing

Building green is not just the right thing to do for the planet, it is also a way to potentially generate better investment returns. If we look 10 years down the line, there may be risks in owning assets that do not meet sustainability targets. Those assets may suffer from less tenant demand, higher operating costs and increased regulations. The cost of capital for those assets is also likely to be higher.



What A Waste

The world generates 2.01 billion tonnes of municipal solid waste annually, with at least 33% not managed in an environmentally safe manner. Worldwide, waste generated per person per day averages 0.74 kilogram but ranges widely, from 0.11 to 4.54 kilograms. Though they only account for 16% of the world's population, high-income countries generate about 34%, or 683 million tonnes of the world's waste.⁴²



When looking forward, global waste is expected to reach 3.4 billion tonnes by 2050, more than double the population growth over the same period. The fastest growing regions are Sub-Saharan Africa, South Asia, the Middle East and North Africa, where, by 2050, total waste generation is expected to more than triple, double and double respectively. In these regions, more than half of waste is currently openly dumped and the trajectories of waste growth will have vast implications for the environment, health and prosperity, thus requiring urgent action.⁴³

Where There's Muck There's Brass

According to a joint Boston Consulting Group – World Business Council for Sustainable Development report, the GCC generates between 105 and 130 million tons of waste per annum, primarily from municipal solid waste, construction and demolition waste and agricultural waste.⁴⁴ The study estimates that it will take US\$60 – US\$85 billion invested across four key value streams, plastic, concrete and cement, metal and bio-waste over the next 20 years to meet collection targets throughout the GCC region. This investment would cover design, collection, sorting and recycling across these four key waste streams.

Based on international best practices, concrete, cement and plastic could potentially be collected at 95%, metals at 97% and bio-waste at 90% in the GCC region. Recyclability of material streams should not stand in the way of such enhancement, as respective technologies either exist already or innovation is underway. The region's ultimate ambition for recycling rates for concrete and cement⁴⁵ should be:

95%



Cement

75%



Plastic

95%



Metal

80%



Bio-waste

The report estimates that contributing to such global targets as 80 – 90% recycling would not only save 0.9 – 1.5 billion tons of CO2 emission by 2040 in the GCC, helping to reduce global warming, but also protecting nature through the conservation of water, land and biodiversity. Quality of life in the region could also be enhanced through reduced air pollution and cleaner, more liveable surroundings.⁴⁶



130mn tons

The GCC generates between 105 and 130 million tons of waste per annum, primarily from municipal solid waste, construction and demolition waste and agricultural waste

Increasing Circularity

The study suggests that increasing circularity in the GCC would yield multi-dimensional benefits including job creation, economic growth, self-sufficiency and independence from external regulatory pressures. Optimizing circularity could also increase GDP by approximately US\$95 –US\$105 billion across the GCC from the four key waste streams, helping generate 205,000 –306,000 jobs, significantly improve people's quality of life and create attractive growth opportunities for the private sector.

205 –306k
Jobs

Job Creation

Economic Growth

Self-sufficiency

Independence

Increase GCC GDP by:
US\$95 –US\$105 bn

Increase Circularity from Waste Streams



1.2 billion tonnes of food
is lost on farms, during,
around and after harvest.

Food Waste

A WWF report estimates that globally 1.2 billion tonnes of food is lost on farms, during, around and after harvest. This is equivalent to 15.3% of food produced. It is estimated that total food loss and waste is over 2.5 billion tonnes – approximately 40% of all food produced.⁴⁷ This is based on the 1.2 billion tonnes of food lost on farms, the 931 million tonnes wasted in retail, food service and consumer homes from the UNEP Food Waste Index and calculations to estimate losses occurring in the post-farmgate transport, storage, manufacturing and processing stages. The report also notes that increases in total amounts of food lost and wasted mean the amount of GHG emissions generated by food that goes unconsumed also increases – from previous estimates of 8% of all total GHG emissions to 10%.⁴⁸

Whilst most of these emissions occur during the production and agricultural process, rather than in households, there is still an important role for government to introduce greater prevention awareness and measures, both in households and local businesses. For example, food waste can be reduced with the right training, incentives and procurement policies in hotels, restaurants, cafes, hospitals and homes. Packaging free shops and local markets can prevent packaging and food waste whilst also providing consumers with fresh, locally sourced food.

Final Word

Omani SMEs should embrace net zero for three compelling reasons.

First, it demonstrates their environmental responsibility by actively addressing climate change and minimizing their carbon footprint. By adopting sustainable practices, SMEs become crucial contributors to a healthier planet and pave the way for a sustainable future.

Second, it offers a distinct competitive advantage. Today's discerning Omani consumers prioritize businesses aligned with their values, placing a premium on sustainability. SMEs that showcase their commitment to net zero attract a loyal customer base of eco-conscious individuals, setting themselves apart from competitors and solidifying their market position.

Third, it yields tangible financial benefits. Sustainable practices often result in cost savings and enhanced operational efficiency. By implementing energy-efficient technologies, waste reduction strategies and resource optimization, Omani SMEs can trim utility expenses and boost productivity. This dual focus on sustainability and financial viability ensures long-term profitability while minimizing waste.

In brief, it allows Omani SMEs to demonstrate environmental responsibility, gain a competitive edge and achieve financial sustainability. It is a strategic imperative that will help companies navigate our evolving business landscape and secure a prosperous future.



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Footnotes

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14	19 Kate Raworth, Doughnut Economics
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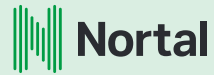
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