

Future Sustainability Summit

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Index

Foreword	05
Executive Summary	06
Convergence	19
Collaboration	31
Consensus	44
Culture	55
Leadership	65



Foreword

**Mohamed Jameel Al Ramahi,
Chief Executive Officer, Masdar**

It is no overstatement to say that we are witnessing the dawn of a new era. Industries are converging, our energy systems are rapidly evolving, electric vehicles are starting to replace conventional cars, and intelligent robots are changing the way we work.

Understanding how the digital transformation now underway is unlocking substantial new economic growth and crucially, what can be done to mitigate the effects of such growth on our climate and environment, was the focus of the 2019 Future Sustainability Summit, held during ADSW, today one of the world's largest sustainability gatherings.

Hosted by Masdar, ADSW emphasises the importance of collective action and knowledge-sharing to address our shared sustainability challenges.

This report provides a fascinating window onto the two-day Summit debate led by the widest cross-section of experts in technology, finance, education and policymaking. It highlights some of the most pressing challenges facing humanity now and in the future: global warming, water and food shortages, rampant urbanisation, and mass youth unemployment. However, it also sheds light on the possible ways in which technological, policy and cultural innovation may overcome them.

The Summit's speakers shared thought-provoking insights on the future of energy, water, mobility, health, space exploration and food security, issues at the heart of the sustainability debate. The potential of digitalisation to help emerging economies move towards cleaner energy systems, mobilise financing, adopt cleaner transport, and accelerate their overall economic diversification with tools such as AI, Blockchain and IoT technologies was also discussed.

While there are those who argue that the changes of the digital era are much too dramatic and disruptive, this report suggests that next-generation technology in the right hands, used responsibly and collaboratively can forge a viable pathway towards a more sustainable future.

At Masdar, we are committed to working with all stakeholders to help deliver the innovative and sustainable solutions the world needs to meet its growing demand both for cleaner energy and a better life. ADSW is the ideal platform to accelerate collaboration and action towards this goal.

Thanks to ADSW, the sustainability debate is at the top of the global agenda each January. It is my hope that this white paper on the outcomes of the Future Sustainability Summit will encourage the sustainability conversation to continue all year round.





Executive Summary

Unprecedented technological transformation, led by big data, artificial intelligence (AI) and the Internet of Things, is enabling the convergence of industries that are improving business efficiency and accelerating sustainability across society.

With natural resources increasingly under pressure and climate change representing a long-term challenge to both humankind and the natural environment, the 2019 Future Sustainability Summit reinforced the urgency for greater collaboration, broader consensus and a change in behaviour to addressing global challenges.

The Summit convened 795 policymakers, industry leaders, entrepreneurs, scientists, academics and innovators from 45 countries to examine their roles in a sustainable future.

Delegates drew attention to the latest reports released by the Intergovernmental Panel on Climate Change (IPCC) and the World Wildlife Fund (WWF), which were both released in the latter half of 2018.

The IPCC's comprehensive assessment reported that a 1.5 degrees Celsius rise could be reached in as little as 11 years – and almost certainly within 20 years, without drastic cuts in carbon dioxide emissions. It also reported that the impacts and costs associated with permanently heating the planet that much will be far greater than expected. The WWF presented the world with an alarming statistic: in less than 50 years, there has been an overall decline of 60 per cent in population sizes of vertebrate species and there is scientific evidence that unsustainable human activity has brought Earth's natural life-supporting systems to a critical point.¹

SUSTAINABILITY SUMMIT



The Future Sustainability Summit was held during ADSW 2019, which was underpinned by the theme, “Industry Convergence: Accelerating Sustainable Development”. ADSW 2019 sought to highlight the potential of the 4th Industrial Revolution to overcome the world’s most pressing sustainability and environmental challenges, and in turn support the successful realisation of the United Nations’ Sustainable Development Goals (SDGs).

The SDGs call on governments and businesses to ensure no person is left behind by adopting a set of benchmarks to achieve ambitious targets such as ending extreme poverty, eradicating hunger, reducing inequalities and combating climate change. They encourage and support new approaches to energy, industry and urban development through innovation.

ADSW’s expansion of its focus beyond energy enabled the Summit to host the most relevant conversations on the key issues that are shaping and positively impacting the world. Over two days, speakers and delegates highlighted the potential, possibilities and outcomes of innovation-led solutions, as well as the opportunities for businesses, governments and civil society to come together for a more equitable future.

Thematic strands led to a diverse range of perspectives creating a narrative that placed the responsibility of developing a sustainable future on every individual, government and corporation.

¹ WWF Living Planet Report 2018



Energy + Climate Change

The International Renewable Energy Agency's (IRENA) report *Global Energy Transformation: A Roadmap to 2050* reinforced the need for renewable energy to be scaled up at least six times faster for the world to start meeting the goals of the Paris Agreement.

The transition from a global economy that is powered by oil and gas to a global economy that has a sustainable mix of energy sources requires a responsible strategy.

Saudi Arabia's Renewable Energy Program seeks to achieve more than 25GW of wind and solar power generation in the next five years, and close to 60GW over the next decade; of which 40GW will be generated from solar energy and a further 16GW of onshore wind.

"We urgently need consensus around an energy transition strategy that is realistic, that is fair and that is pragmatic, driven by economics and technology, not blind ideology."

**HE Khalid bin Abdulaziz Al-Falih,
Minister of Energy, Industry and
Mineral Resources, Saudi Arabia**

“37 per cent of the world’s population are willing to commit money to help tackle climate change and 80 per cent of the world’s population are very worried about it.”

Francisco Benedito, Co-Founder, Climatetrade



“Our responsibilities are not limited to addressing the economic aspects through the development of strategic action plans. We must all work to promote sustainable principles, which can only be achieved by nurturing a culture that supports sustainable development. A person who believes in the importance and necessity of preserving our energy, natural resources, and environment is a pillar of sustainability.”

H.E. Eng. Awaidha Murshed Al Marar, Chairman, Department of Energy, a member of the Executive Council, Abu Dhabi





Water

More than 3.5 billion people live in potentially water-scarce areas and this could rise up to 5.7 billion by 2050.² As the global consumption of water doubles every 20 years, securing clean potable water is a critical issue. Climate change is exacerbating the water scarcity challenge, as for each degree of global warming, approximately 7 per cent of the global population is projected to be exposed to a decrease of renewable water resources.

Look at water supplies and the expense of extracting, cleaning and delivering water; these are difficult problems. It's about the cost society wants to bear today versus tomorrow. And what the cost of bearing that is today for tomorrow. That's very hard math to do."

Matt Barnard, CEO, Plenty

² Masdar Future of Sustainability Report



“Recycled water in Singapore, known as new water, and desalination provide us with new sources of water that are more climate resilient. As a result of these efforts, our water sector closely reflects a circular economy.”

HE Masagos Zulkifli, Minister of Environment and Water Resources, Singapore



Food

Food that is produced but uneaten, contributes to about 3.3 gigatons of greenhouse gas emissions each year. Besides having a tremendously negative impact on the environment, such an alarming level of food waste poses a serious problem from both an economic and humanitarian perspective. It is estimated that somewhere on the scale of 1.3 billion tonnes of food is produced but wasted annually, either due to food loss or direct food waste. This amounts to about a third of what is produced globally.³

A more alarming finding is that the United States and the developing world appear to be wasting the same qualities of food. In the US, about 30 to 35 per cent of the food produced is wasted, while in sub-Saharan Africa, depending on the region, between 20 and 40 per cent of the crops that are left in the ground don't ever get to market to consumers who need them.

"First of all, just zooming out, we're talking about a third of all food being wasted, about a trillion dollars a year in terms of economic value that's thrown away."

Marc Zornes, Co-Founder, Winnow Solutions

"Water is probably the biggest challenge we have when it comes to food production, especially in the UAE, where we have water scarcity. The only way forward is using technology. We need to rapidly evolve the technologies that are available, bring them to the UAE and then adapt them to the environment we have here."

HE Mariam Al Mheiri, Minister of State for Food Security, UAE

³Food wastage footprint: Impacts on natural resources - Summary report <http://www.fao.org/3/i3347e/i3347e.pdf>



Youth + Skills

New technological forces are transforming the world of work. They are creating new jobs and today's skills will not match the jobs of tomorrow. Furthermore, newly acquired skills may quickly become obsolete.

While greening national economies promises to create millions of jobs, other jobs are sure to disappear as countries scale back their carbon- and resource - intensive industries. The youth bulge in some parts of the world, and ageing populations in others, risks greater pressure on labour markets and social security systems. However, the shifts also present opportunities to create inclusive, active societies.

"Society continues to evolve. We are today in what's called the Fourth Industrial Revolution because the first, second and third worked, and I think that's exciting. There's lots of good technology. I'm optimistic that there will be a way in which society readjusts, jobs readjust and people find a way to make this work. I think that's what history tells us."

Dr. Steve Griffiths, Senior Vice President, Research & Development, Khalifa University

Digitalisation

Digital technologies are able to accelerate the progress of SDGs. From reducing inequalities by providing education and healthcare services to remote areas to blockchain's potential of driving progress in sectors as varied as energy, trade and food safety – the potential of technology is tremendous.

As the world becomes increasingly urban, there is an urgent need to rethink and rework the way we approach urban development and urban living. It is estimated that by 2050, approximately three-quarters of the world's population will live in cities, placing an incredible strain on infrastructure and resources.

The benefits of technology are not limited to SDG 9 (Industry, Innovation and Infrastructure), but are deeply integrated into the broader 2030 Agenda. With a consensus emerging that the world is racing against time to meet the SDGs, solutions led by digital innovation featured prominently in the discussions hosted at the Summit.

"In Africa, we can leap ahead by using AI technology, blockchain technologies in education, health and other industries. I believe that will be possible if we teach the people that are making the decisions as well as those people making the technologies."

Betelhem Dessie Asnake, Project Manager, iCog - Anyone Can Code and Project Advisor, Solve IT! Innovation Competition

"Industry 4.0 is a combination between cyber and physical security, between augmentation and automation. It's basically creating smart factories. Now, most companies are trying to be more efficient. And when you look at oil and gas or renewables, the concept is really the same. We need to have as many sensors as possible and we need to reduce human interaction, save costs, achieve these things faster and better."

Jamil Asfour, Partner, Roland Berger

"Frankly, across the world, most people are struggling to keep the city just about functioning. So, I think the biggest challenge is how to collectively collaborate with cities, to help them move along the journey."

Brian Davis, Vice President, Energy Solutions, Shell New Energies





Mobility

With sustainable urban development increasingly an area of focus, transportation infrastructure inevitably comes under the spotlight. Road congestion affects everyone and ends up contributing to higher levels of air and noise pollution.

Current transportation models and solutions still use technologies and economics that are rooted in the 20th century. They are resource intensive and major contributors to global carbon emissions, making the need for innovations within this sector extremely critical.

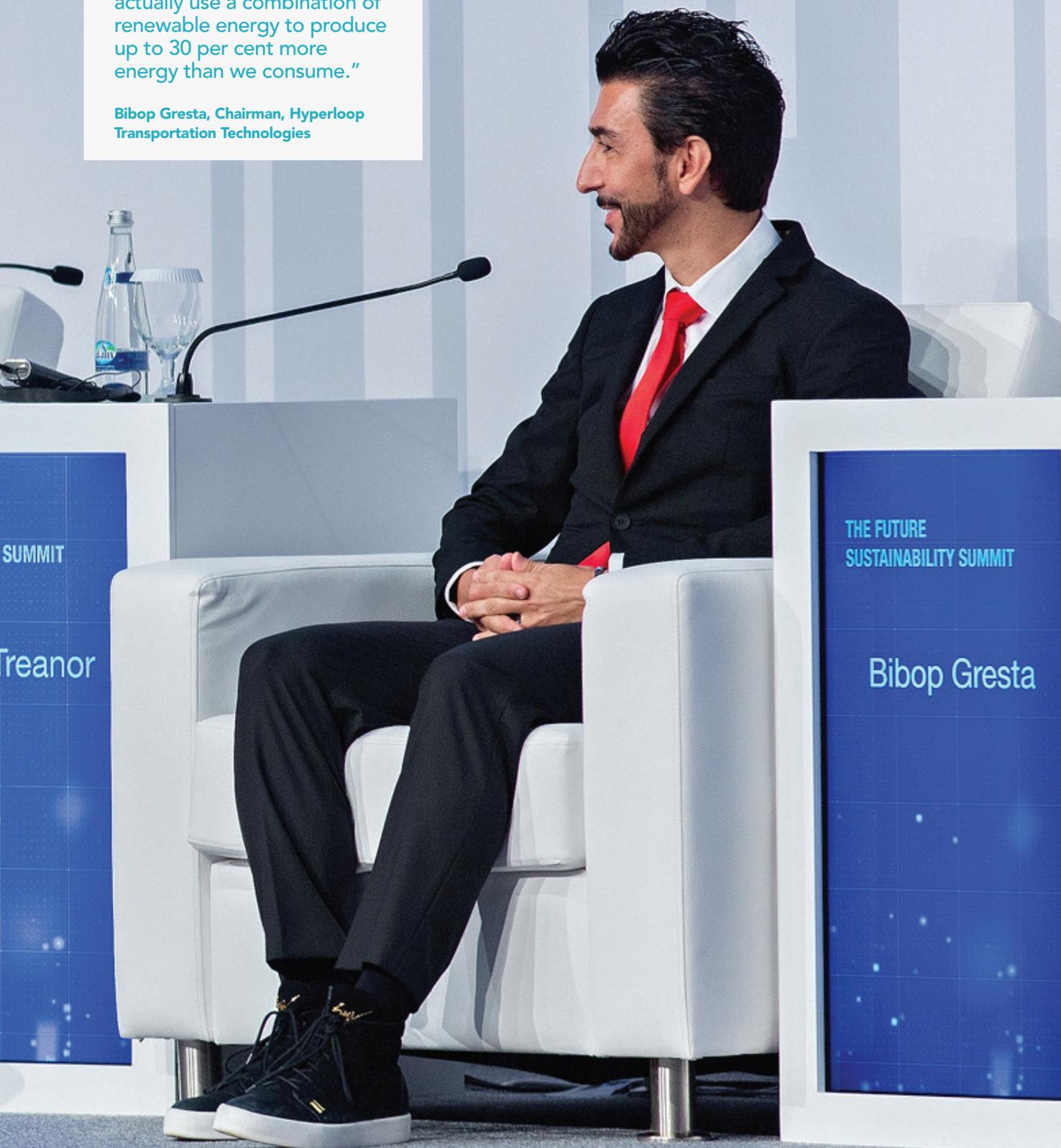
Electric vehicles, autonomous vehicles, next-generation buses and smart parking are all part of the developing technologies, with The Hyperloop generating interest as a viable transporter of people and goods. Working by propelling pods through a sealed tube at speeds of about 1,207 km/h using magnets, the pioneering technology is starting to become a reality.

“Within about five years, many EVs will be cheaper to buy than traditional fossil fuel vehicles. When that happens, the market for fossil fuel vehicles is pretty much going to drop, because how do you resell a car that costs more to buy and to run. It doesn’t last as long and the market will disappear.”

**Daniel McMurray, Chief Catalyst,
Global EVRT**

"The exciting part of what we are building is that we are trying to actually solve one problem without creating another 10. It's the fifth mode of transportation. We have an amazing opportunity to write a piece of new history, not only on transportation, but how we conceive infrastructure. The Hyperloop introduces this amazing new element, wherein we actually use a combination of renewable energy to produce up to 30 per cent more energy than we consume."

Bibop Gresta, Chairman, Hyperloop Transportation Technologies



Outcomes

Industry **convergence** has been identified as having the potential to solve the world's greatest social challenges. We need a new coalition of alliances between businesses that includes public and private players, in order to identify and create large-scale solutions that can tackle climate change and sustainable urban development. In this renewed environment, companies have the opportunity to integrate digitisation and also leverage each other's capabilities and strengths for the most scalable impactful outcomes.

Digitisation, innovation and technology are linking together previously separate industries. We are already accustomed to the convergence of technology, telecommunications and media – as we have been subscribing for video or TV content through telecoms companies that also allow us to make phone calls. With the Fourth Industrial Revolution, convergence is affecting more sectors and industries such as healthcare, energy, transportation, consumer products, education and insurance.

For convergence to have the maximum positive impact on society, there is an urgent need for greater **collaboration** between the stakeholders. The most successful partnerships are the ones that benefit society and are also good for business. Most businesses (more than 70 per cent) agree that the SDGs should be their north star for setting sustainability targets.⁴ Companies are most focused on the SDGs related to climate change, decent work and economic growth, responsible consumption and production, and gender equality.

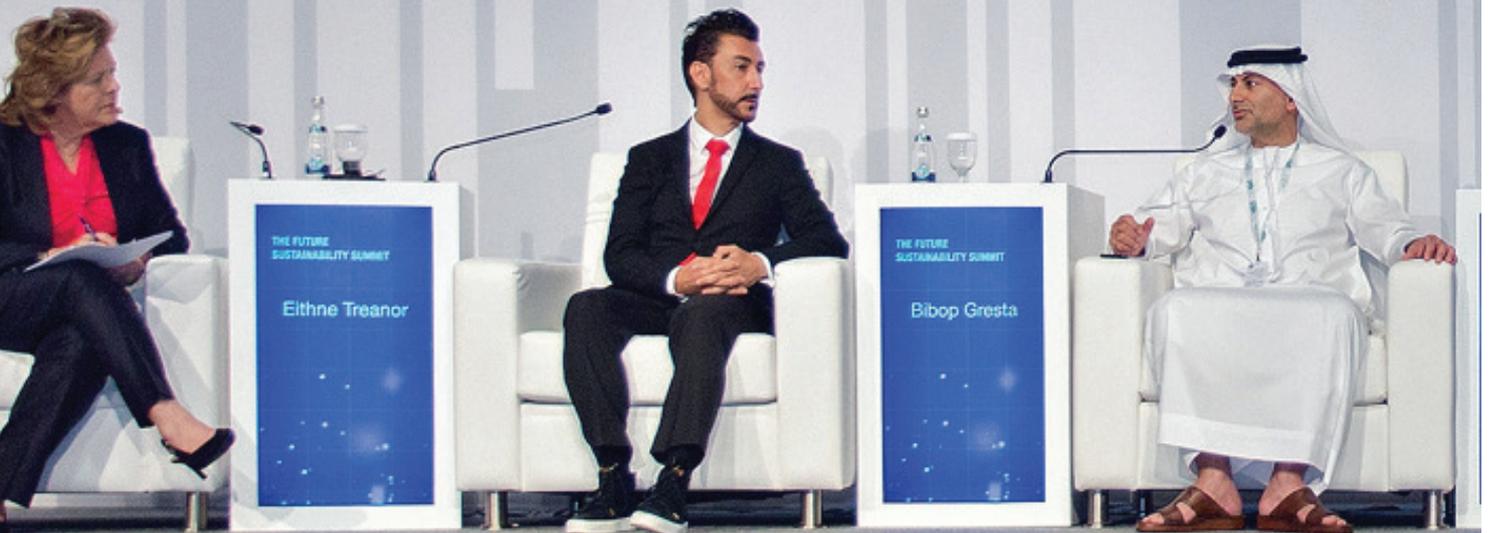
A collective call for drastic behavioural change was made at the Summit. While the required technologies and innovation are being created, a rapid and serious **culture** is also needed in order for people, businesses, governments and countries to create deep, sustainable impact.

⁴<https://www.bsr.org/en/our-insights/report-view/state-of-sustainable-business-2018-bsr-globescan>

THE FUTURE SUS



Sustain
Twin Pil
Modern



Convergence

"Imagine how city life would change if you could go from Abu Dhabi to Dubai in 12 minutes, or travel thousands of kilometres in less than an hour."

Bibop Gresta, Chairman, Hyperloop Transportation Technologies

Convergence

With more people now living in cities than in rural areas, human beings are rapidly becoming an urban species. Historically, cities have been considered the source of knowledge, innovation and opportunity, and with more than 80 per cent of the world's GDP supported by just half of the world's population, who live in cities, it is little surprise that there has been a surge in urban migration.

It is estimated that by 2050, two-thirds of the world's population will be living in urban areas. Asia and Africa are expected to be the fastest urban growth areas,⁵ and slums are projected to be the fastest growing habitat.⁶

Urbanisation presents several human development challenges. The expansion of slums raises obvious concerns about growing economic inequalities and unsanitary living conditions, with the unplanned swelling of cities exacerbating already strained infrastructure.

Recognising the urbanisation of humankind, the UN's SDG 11 aims to make cities inclusive, safe, resilient and sustainable. Governments, urban planners and policy makers are focused on implementing efficient urban planning and management practices to address the challenges brought by urbanisation, whilst creating jobs and economic prosperity.

Common urban challenges include congested roads, poor public transportation, inadequate housing and schools, declining and decaying infrastructure and rising air pollution within cities. There needs to be a future in which cities provide opportunities for all, with access to basic services, energy, housing, transportation and more, as these in turn enhance cities' competitiveness and growth prospects.

"[If] we look at going through the energy transition and this megatrend of urbanisation, we'll probably see another 1 to 2 billion people living in cities by the middle of the century, and maybe 80 per cent of the world's energy will be consumed in cities."

Brian Davis, Vice President, Energy Solutions, Shell New Energies

Case study **Masdar City, Abu Dhabi**

Masdar City is Abu Dhabi's flagship sustainable urban community comprising one of the largest clusters of low-carbon buildings in the world. Developed on the three pillars of economic, social and environmental sustainability, the city is incubating real-world solutions in energy and water efficiency, mobility, sustainable farming and waste management. Approximately one third of the city's power needs are generated from solar power on site, while all buildings, which to date include private homes, offices, a research institute, and a shopping mall, are mandated to achieve a minimum 3-Pearl rating according to Abu Dhabi's bespoke green building framework, Estidama.

⁵UN Department of Economic and Social affairs
<https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html>

⁶<http://hdr.undp.org/en/content/rapid-urbanisation-opportunities-and-challenges-improve-well-being-societies>

THE FUTURE SUSTAINABILITY SUMMIT



Smart Cities: The Intersection of High- and Low-Tech Solutions



THE FUTURE SUSTAINABILITY SUMMIT
Gregg Carlstrom

THE FUTURE SUSTAINABILITY SUMMIT
Abdulla Balalaa

THE FUTURE SUSTAINABILITY SUMMIT
Brian Davis



Cities, which occupy just 3 per cent of the Earth's land, account for between 60 and 80 per cent of energy consumption and 75 per cent of carbon emissions. Furthermore, many cities, particularly those along the coasts are more vulnerable to climate change and natural disasters.⁷

Against this backdrop, industry convergence, which is bringing together previously separate industries, is demonstrating its ability to help tackle global issues such as climate change and urbanisation, while providing the opportunity for greater collaboration among different business sectors.

“When we say smart cities, we are utilising technology, collecting data and analysing that to come up with a better way of how you can create sustainable development and sustainable assets, to serve people in a better manner, meet their expectations and basically make their life easier.”

Abdulla Balalaa, Director, Real Estate Development and Design, Sustainable Real Estate, Masdar

⁷ <https://www.un.org/sustainabledevelopment/wp-content/uploads/2018/09/Goal-11.pdf>



Developing smart buildings as part of smart city design, intimately ties in construction, design, energy, water and technology. Unlike the cities of yesterday, which were sprawling environments that grew up in a haphazard manner, a critical element of smart cities is the integration of intelligent design introducing greater energy efficiency in mobility.

Decarbonising urban activities, including the transportation of people and goods, is a priority, as are the sources of powering urban infrastructure.

“There are opportunities for cities to think about providing energy in the right form, not just from a carbon point of view, but from a local air quality point of view.”

Brian Davis, Vice President, Energy Solutions, Shell New Energies

The technologies exist, according to Markus Strohmeier, Senior Vice President for Building Technologies, Siemens. The actual issue he says is applying the technologies. "Nowadays it's possible to save 50 per cent of the energy consumption of a building. Why do I need to generate electricity, if I am efficient with my consumption, and then I have to transport it just to end up in a building that wastes it by 50 per cent? It's because the newest technology has not been applied."

As technology advancements and consumer behaviours drive industry disruption, convergence has emerged as a natural consequence of digitalisation and hyper-connectivity. The Hyperloop is an example of solving an issue without creating new challenges. Dubbed the fifth mode of transportation, it is expected to transform terrestrial transportation and use a combination of renewable energy to produce up to 30 per cent more energy than it consumes, which has heightened the anticipation and excitement surrounding its debut.

"The future of energy is really a triangle between digital, electricity and climate change."

Marianne Laigneau, Group Senior Executive Vice President in Charge of the International Division, EDF Group





As technology companies increase their online and offline footprint for data centres, there is a growing demand for green electricity to feed their supply. To that end, EDF Group has a contract to provide wind power in North America to a Google data centre. With the global appetite for power only growing, a sustainable energy mix led by renewables is a more realistic target. In the region, EDF Group and Masdar set a new record with their historic win of the first large-scale wind farm in Saudi Arabia – set to be the largest in the Middle East.

However, if electricity networks made the transition to solar power, wind, and nuclear, it would only address part of the global energy challenge. Industry and society will still be using fossil fuels to power our cars and transport our products and commodities around the world. Addressing the broader energy trilemma will require solutions that go beyond solar and wind.

Aviation contributes between 2 and 4 per cent of global carbon emissions, with aviation companies worldwide estimating that the fleet of commercial aircraft flying will double in the next 20 years. During the same period, the aviation sector aims to reduce its carbon footprint by half.

While changes to infrastructure, operations (the way we fly), and market-based measures such as carbon offsetting that are approved by The International Civil Aviation Organization (ICAO) are part of the sector's strategy, technology will do the heavy-lifting to help reach the sector's sustainability goal.

“The way that we fly today is fundamentally not going to change for the next 40 to 50 years. And by that I mean if you want to transport hundreds of passengers for thousands of kilometres, the technology we have today will not fundamentally change.”

Dr. Alejandro Rios Galvan, Director, Sustainable Bioenergy Research Consortium; Professor of Practice, Department of Industrial and Systems Engineering, Khalifa University





The aviation industry has invested heavily in trying to develop sustainable alternative fuels and a large component of that will be biofuels coming from biomass, waste gases, garbage or similar feedstock.

At ExxonMobil, the company made a breakthrough with its research partners Synthetic Genomics, whereby they were able to double the oil yield from algae by using a genetically-modified algae. According to ExxonMobil's Khurram Gaba, the breakthrough represents an important step forward in scalability. "The other half of the solution is affordability. So that's where we're now shifting our R&D efforts," he said.

The company is moving out of the lab into large-scale algae pilot plants, where they hope to further demonstrate the commercial viability of the technology.

"We've set ourselves the target for 10,000 biofuel per day (bpd) of algae-based biofuel by 2025. That's a small proportion of the total transport needs and I'm not positioning this as the solution, but an important part of the solution. On the other hand, 10,000 bpd is not insignificant either. It would power 30,000 commercial flights per year between New York and Los Angeles, which is a distance of 4,000 kilometres."

Khurram Gaba, Policy Planning Executive, ExxonMobil



Research in developing sustainable solutions has benefited from the heating up of the international space race and ambitions to colonise Mars. Space programmes have spawned technologies that have led to everything from laser eye surgery to the commercialisation of soft drinks. While space travel is all set to become a reality with Virgin Galactic and other private players, it has also been criticised in some quarters as a vanity project.

“Space technology is just a stepping stone to other technologies for rapid modes of transportation that further shrink the world. Space is a very unifying element. And when you look to big data, AI, digitalisation, and space, it makes it all possible.”

**Steve Landeene, Chief Advisor,
Virgin Galactic**



Although the space industry has struggled with providing products that are suited to the needs of the end user, as they may be technologically complex or not integrate seamlessly with other resources or tools, it has become more entrepreneurial in recent years. It is more attuned with the end user's requirements and has broadened its thinking to visualise the technology's final destination.

"I think the UAE is very interesting for the breadth of its space programme and activities. Many newer space players globally will be more targeted on satellite applications for economic development. The breadth of the UAE's activities runs from satellite manufacturing and satellite applications to remote sensing, telecommunications, scientific research and exploration, even to a Mars mission. That's a very unusual profile for an emerging space player."

Carissa Bryce Christensen, Founder & CEO, Bryce Space and Technology

ing Director, E Trean

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OF ENERGY



11

or Media

Collaboration

"We need collaborative action, as we're seeing here at ADSW, to make the energy transition a reality, particularly when it comes to transformative technology development and deployment."

HE Khalid bin Abdulaziz Al-Falih, Minister of Energy, Industry and Mineral Resources, Saudi Arabia

Collaboration

The world needs to figure out how to feed nearly 10 billion people is needed by 2050. It is estimated that double the amount of food is needed merely to avoid food security challenges and social disruption. Furthermore, this food output needs to satisfy the appetite of a growing urban population, whose dietary demands vary from those of their rural counterparts. As urban migration results in the dwindling of rural populations around the world, agriculture is faced with the challenge of a loss of labour.

The UN SDGs aim to eradicate hunger while addressing climate change. But current crop yields indicate that there will only be enough food to feed half of the world's projected population. With our current rate of crop yields, we'll only have enough food for half of the projected population.

Currently, it is estimated that between 33 and 50 per cent of all food produced globally is never eaten, and the value of this wasted food is more than US\$1 trillion annually. In countries such as the United States, 40 per cent of everything that is harvested is wasted along the food supply chain, with around 20 per cent of the wastage occurring at farm level.⁸ Food waste is an inexcusable market inefficiency, considering 800 million people go to bed hungry every night. Each and every one of them could be fed on less than a quarter of the food that is wasted in the US, UK, and Europe each year.⁹

It is unsurprising that the entire 'farm to table' cycle is ripe for new sustainable solutions that increase efficiency and address global food security challenges. In the world of AgTech, technological developments are being introduced and applied across the food supply chain. Innovation is revolutionising farming, representing an important collaboration between one of the oldest industries and future technologies.

The future of agriculture is already upon us as produce is grown using new techniques such as hydroponics and seawater farming; new technologies such as vertical farming and labgrown meat are bringing food production to consumers and increasing efficiencies within the food chain; while the sector is also incorporating cross-industry technologies and applications such as drones, data analytics and blockchain.

"Science is no longer a choice in the world in which we are living today. Investment in technology is no longer a choice. It is a necessity of the 21st century. It is fundamental to every single industry sector."

HE Sarah Al Amiri, Minister of State for Advanced Sciences, UAE

⁸ Christine Moseley, Founder & CEO, Full Harvest, Future Sustainability Summit

⁹ <https://www.oliverwyman.com/content/dam/oliver-wyman/v2/publications/2018/February/Oliver-Wyman-Agriculture-4.0.pdf>



Case study **Hywind and Batwind, Scotland**

An Equinor-Masdar consortium is investing in the wind power technology of the future. Hywind Scotland, the world's first floating wind farm, is located off the coast of Aberdeenshire. Consisting of five 6-megawatt (MW) turbines tethered to the seafloor, this potentially game-changing technology is paving the way for further development of as yet untapped wind energy resources far out to sea. What's more, since May 2018, the project has been connected to Batwind, the world's first smart battery integrated with an offshore wind farm, which is designed to release electricity to the grid when it's most needed.



In recent years, food security has become a national priority in the UAE, which currently imports more than 80 per cent of its food requirement, the majority of which are vegetables.¹⁰ In 2018, the government unveiled the National Food Security Strategy 2051, which aims to ensure access to safe, nutritious and sufficient food all year round. The strategy specifically aims to implement resilient agricultural practices that increase productivity while helping to maintain ecosystems.

With food production inextricably linked to water and energy, urban farming developments such as vertical farming have already made an appearance and are integrating smart water systems to meet the growing demand from increasing city populations. Badia Farms in the UAE was the Gulf's first indoor vertical farm but many other companies have entered the sector.

“With the advancements in horticulture, agriculture and plant science, we have a solution to grow a quality crop year-round sustainably. We could do so using 90 per cent less water and zero pesticides. If it wasn't for technology, we wouldn't be able to grow these types of products or crops all year-round.”

**Omar Al Jundi, Founder & CEO,
Badia Farms**

¹⁰Mohammed Bin Rashed Al Maktoum Global Initiatives | Advancing food security in the UAE
<https://www.mbrsg.ae/getattachment/859ddec7-f5ed-48dd-99dd-4e1b8f326112/Advancing-food-security-in-the-UAE>



Currently, agriculture represents around 70 per cent of the water consumption in most of the GCC countries. With more than 90 per cent of the land in the region not suitable for agriculture, it is little surprise that the contribution of the sector towards national GDP is not significant. Saudi Arabia, which is the world's largest producer of desalinated water, uses 80 per cent of its water resources for agriculture, which only accounts for 2 per cent of the country's GDP.

Multi-fold strategies are required to address the critical issue of water scarcity. From educating consumers, who are considered to be amongst the highest domestic water consumers in the world, to supporting modern techniques that encourage sustainable agriculture and horticulture. Addressing such challenges presents opportunities for cost savings, while driving investment and innovation.

“When you look at water supplies and the expense of extracting, cleaning and delivering water, there are serious problems. What cost does society want to bear today versus tomorrow? And what’s the cost of bearing today versus tomorrow? That’s very hard math to do.”

Matt Barnard, CEO, Plenty

As the agriculture industry explores new opportunities to yield more produce, vertical farming is receiving more attention from the industry. According to Badia Farms' Al Jundi, expansion into indoor farming and controlled environment agriculture allows for the production of fine crops such as tomatoes, peppers, chillies, cucumbers and melons. "Once we reach this stage, I believe that technology will have advanced to where we can grow other types of crops, but it really is our only way forward, and as a region, we need to embrace this technology," he said.

There is huge potential for growth within the smart agriculture industry. In 2017, total investment was over US\$1.5 billion – a new record for the sector.¹¹ In March 2019, the Abu Dhabi Government launched a AED1 billion programme to support the establishment of AgTech companies in the Emirate. The initiative is part of an accelerator programme to support agricultural innovation in desert environments.

"Just zooming out, we're talking about a third of all food being wasted; that's about a trillion dollars a year in terms of economic value that's being thrown away."

**Marc Zornes, Co-founder,
Winnow Solutions**

¹¹ <https://www.weforum.org/agenda/2019/02/why-the-agtech-boom-isn-t-your-typical-tech-disruption/>



Winnow Solutions is also tackling large-scale food waste – at the commercial restaurant level – in an effort to ensure that kitchens in the hospitality sector are buying and using food efficiently.

Work done by ReFED in the US estimates that kitchens in consumer-facing businesses such as restaurants, the hospitality sector and supermarkets account for about 40 per cent of the food waste problem, with the remaining 40 per cent occurring in the home. “We work in over 1,000 kitchens around the world in about 40 different countries. What we find when we go into kitchens is that anywhere between 10 and 20 per cent of what gets purchased actually never gets eaten in these operations,” Zornes said.

In the absence of smart tools, Zornes estimates that the economic value of food that is wasted in the hospitality industry amounts to about a hundred billion dollars annually.

Technology is helping kitchens to understand in a very granular way what is being thrown away and why. That sort of data allows companies such as Winnow Solutions to share analytics with chefs to help them understand how they can improve their operational practices to significantly reduce food waste in their kitchens.

Food waste costs the UAE around AED13 billion or US\$3.5 billion each year. In 2018, the Ministry of Climate Change and Environment initiated the UAE food waste pledge campaign with the aim of saving 1 million meals that year, two million in 2019 and three million in 2020.¹²

The Ministry of Climate Change and Environment teamed up with Winnow Solutions as part of the effort to cut down the UAE’s food waste.

“We are delighted to sign an MoU with Winnow on our collaboration. The UAE hospitality sector is one of the few in the world to take such a decisive step that aligns with global targets to halve food loss and waste by 2030 under the SDGs. Preventing food waste saves our valuable resources such as water, energy and land. That makes good business sense.”

**HE Dr. Thani Al Zeyoudi,
Minister of Climate Change
and the Environment, UAE**

¹²UAE Ministry of Climate change and Environment
<https://www.moccae.gov.ae/en/media-center/news/16/10/2018/minister-of-climate-change-and-environment-witnesses-15-uae-businesses-pledge-to-reduce-food-waste-on-world-food-day.aspx#page=1>



ABU
DUBAI
WEEK

مبادرات
DEPARTMENT

THE FUTURE
OF SUSTAINABILITY



مصدر
Masdar

Emaar, Majid Al Futtaim and Al Rotana were the first UAE-based hospitality companies to take on the challenge of reducing food waste in their kitchens. In October 2018, 15 additional companies joined the pledge, and by the end of the year had collectively saved 1.5 million meals from the bin.

The UAE's Seawater Energy and Agriculture System (SEAS) project, a flagship project of the Sustainable Bioenergy Research Consortium hosted at Masdar City, produces food and fuel using the three assets the country has in copious amounts: sun, sand and seawater. It combines an integrated system of aquaculture, halo-agriculture, and mangrove silviculture to produce sustainable biofuels for aviation, and other byproducts such as seafood.

"The private sector has the most important step to take towards investing in early stage companies. Governments can do better as a source of backup investment in larger infrastructure opportunities, but venture and growth stage capital investment should be done by the private sector. That's my opinion."

HRH Prince Khaled bin Alwaleed bin Talal Al Saud, Founder and CEO, KBW Ventures





In the system's operation, water is pumped from the sea to supply the aquaculture ponds to breed shrimp and fish. The nutrient-rich water is used to irrigate and fertilise *Salicornia* fields. These salt-loving (halophytic) plants are then harvested for their oilseeds, which can later be converted into aviation biofuel. The leftover seed meal can also be used as feed for fish and shrimp, or as a source of protein for animal feed. Finally, the effluent coming from the *Salicornia* fields is channelled to mangrove swamps, which filter the water before it is returned to the sea. The mangroves also act as a carbon sink due to their extensive root structure.¹³

In January 2019, Etihad Airways the UAE's first commercial flight, EY77 from Abu Dhabi to Amsterdam, powered in part by the biofuel generated from the SEAS project. The locally-made biofuel's seed oil was processed by ADNOC Refining and delivered by ADNOC Distribution.

"The platforms currently include AI, data science ICT, advanced ICT, cybersecurity, robotics and advanced materials in manufacturing. Around this framework, we are trying to build capabilities for the new sectors that are coming in and will be populated. In an optimistic sense, I think there's a great opportunity for automation to be supportive of building these industries."

Dr. Steve Griffiths, Senior Vice President, Research & Development, Khalifa University

¹³ <https://sbrc.masdar.ac.ae/index.php/projects/seas/item/76-the-seawater-energy-and-agriculture-system>

The flight is an important milestone for the aviation sector, which combined with other modes of transportation is a significant contributor to human-induced carbon emissions.

Collaboration across industries is being spearheaded by research in space technologies, which is leading to some extraordinary discoveries and innovation whose applications extend to sectors beyond space exploration. In the UAE, Abu Dhabi has brought together three universities that were focused in different areas of specialization to create a single model, wherein they could continue their study of health, space and supply chain logistics, while creating new platforms to attract R&D.

The UAE's Mars Mission has sparked extraordinary enthusiasm for STEM education programmes, with the aim of producing a future workforce that will be complemented by machines.

I don't believe that robotics and automation will take over and humans will sit and do nothing."

**HE Dr. Mohammed Alahbabi,
Director General, UAE Space Agency**



Sectors that rely on manual dexterity and physical exertion, such as construction, manufacturing and transportation, are natural choices for automation. "Where you can't automate, is where the opportunity lies. You're training people to be the developers of the technology, so someone is in charge of thinking about what the robot should do and trying to help people understand how to connect business to the people that do the technical jobs. The new platforms already exist. We can figure out what the next industry will be and how we can displace an incumbent to do something as revolutionary as Google," Dr. Griffiths said.

"Enablement is key for the technology sector and that enablement can come from governments very effectively. In the Middle East, I've seen a significant shift in terms of making sure that the basic ingredients of setting up a start-up ecosystem are actually in place. I'm optimistic about the pace at which the government is facilitating the growth of the sector."

**Faisal Rehman, Regional Head,
Softbank Investment Advisors**



Consensus

Over the last 50 years, human-led activities have resulted in the release of exponential quantities of carbon dioxide, affecting global climate. In 2018, CO₂ emissions climbed to a record of 37.1 gigatons. Emissions from fossil-fuel sources grew 2.7 per cent more quickly than the previous year, which saw a 1.6 per cent increase.¹⁴

Developed countries and major emerging economies are the worst offenders for total carbon dioxide emissions, with the world looking at China, the United States, EU and India to lead the way in cutting emissions.

Further increases are projected in 2019 and there is a general consensus among the global community that developed countries need to be doing more.

For nations that rely heavily on fossil fuels such as coal, natural gas and crude oil to drive their economies, the goal of reducing emissions is complex. However, wind and solar energy are now commercially competitive against traditional forms of power generation, making renewable energy a viable option for new, low-cost power generation capacity. The energy transition will not occur overnight and will require renewable and traditional power generation to work together in parallel for some time.

“There is a very strong global recognition that the main momentum of energy transition is now unstoppable. The business case for decarbonisation is a compelling one and the future of energy is going to be dramatically different to the one we see today. I think that’s the key thing that is going to have broader geopolitical implications.”

**Adnan Amin, former
Director-General, IRENA**

Case study - Caribbean Renewable Energy Fund

The US\$50 million Caribbean Renewable Energy Fund (UAE-CREF) is extending the clean energy access of countries in the region while improving their resilience to the effects of climate change and extreme weather. With the backing of the UAE Ministry of Foreign Affairs and International Cooperation and the Abu Dhabi Fund for Development, and with Masdar as project manager, the Fund is deploying solar and battery storage projects in 16 Caribbean countries. Three projects with a combined capacity of 2.3MW have already been unveiled in the Bahamas, St Vincent and the Grenadines and Barbados, altogether saving 895,000 litres of imported diesel and displacing more than 2.6 million tonnes of carbon emissions annually.

¹⁴ <https://www.wri.org/blog/2018/12/new-global-co2-emissions-numbers-are-they-re-not-good>





The geopolitics of today have, to a large extent, been shaped by the availability of and the trade in fossil fuels, which has dominated the global economy. This inevitably raises questions about what the future holds, not only for the energy sector, but for nation states generally.

Helima Croft, Global Head of Commodity Strategy at RBC Capital Markets, has observed that conventional fossil fuel producers such as Venezuela and Nigeria are facing major systemic challenges.

“[In Nigeria] 200 million people are still heavily dependent on oil revenue and have huge challenges in terms of poverty, in terms of sectarian violence, and in terms of environmental issues. How they adapt in terms of diversification will be really key for them.”

Helima Croft, Global Head, Commodity Strategy, RBC Capital Markets



Nigeria is the largest oil producer in Africa and ranks among the top economies most reliant on oil. Over the years its GDP growth has slowed, as an inevitable result of lower oil prices. Despite this, Nigeria's economy is projected to rise through the world rankings to enter the top 10 by 2050, with a projected GDP of US\$6.4 trillion, surpassing Germany, the UK, France and Saudi Arabia. However, to achieve this, a shift away from dependency on crude oil is mandatory.¹⁵

Nigeria and Angola are Africa's leading oil exporters. The resource has sustained their respective economies, accounting for over 90 per cent of exports and a significant proportion of their national GDP. Unsurprisingly, the effect of the oil price slump on both countries in recent years has been dramatic. In Angola, for instance, an estimated 60,000 jobs have been lost in the last 12 months.¹⁶

“Work is being done with great decisiveness, within a very short period of time, and we have been able to see the outcomes. Another issue of our society is the strong reliance of our economy on a single export product. I’m referring to oil. So, this is another situation that needs to be corrected.”

**HE João Lourenço, President,
Republic of Angola**

¹⁵ <https://www.pwc.com/ng/en/assets/pdf/nigeria-looking-beyond-oil-report.pdf>

¹⁶ <https://oilprice.com/Energy/General/Oil-Dependent-African-Countries-Desperate-To-Find-New-Markets.html>



For countries that are already facing great instability and producing resources that are falling in demand, seeing their purchasing power diminish further will inevitably lead to greater instability.

President Lourenço further elaborated on the major issue Angola faces. “In the first place, it is how the political class, or at least part of it, used to view dealing with public money, with public goods, and this in turn, affected part of our society. I am referring to the corruption that prevailed in our society for quite some time.”

“The nature of industry is going to change and trade in commodities is going to change. And that is going to have geopolitical implications as well as implications for the incumbents in this industry who are right now benefiting, unless they’re able to adapt.”

Adnan Amin, former Director General, IRENA



Helima Croft cautioned that the “international community should not be complacent about what might happen to these countries if they are unable to diversify. One of the challenges is that when we think of the hydrocarbon producers that need to make [the transition to new energy sources], there is a role for the international community [to help] these countries.”

Obaid Amrane, member of the management board at the Moroccan Agency for Solar Energy (MASEN) stated his belief that providing such help is not simply a question of finding technological solutions. It also involves creating new ways to improve and maintain sustainability in any policy set forth for both developing and developed countries.

“I believe that the availability and affordability of energy is one of the major elements of stability. I think that the major nations and policymakers should work on that to improve [energy access] to all humanity.”

**Obaid Amrane, Management Board,
Moroccan Agency for Solar Energy
(MASEN)**



Africa's electrification rate is the world's lowest at 40 per cent. Increasing access to electricity plays a key role in development in the region. Technical innovations, especially in solar power, provide the possibility for faster progress by complementing grid expansion with mini-grids and home-based systems. There has been a limited amount of investment already in mini-grids in parts of Sub-Saharan Africa, and several countries, including Nigeria and Rwanda, are now undertaking regulatory reforms to lower barriers to mini-grid investment.¹⁷

"We need to have more governments actually providing a reliable framework in Africa where we investors and lenders can actually invest with comfort."

Marcus H. Schrauf, Founder, Ingwe Development

¹⁷ <https://www.worldbank.org/en/region/afr/publication/boosting-access-to-electricity-in-africa-through-innovation-better-regulation>



One of the biggest obstacles to progress in Africa is reaching decision-makers. More focus is needed on putting in place transparent frameworks to support diversification and mitigate climate change.

As urban populations grow, there is understandably a growing emphasis on sustainable solutions for mobility, but it was highlighted at the Summit that most policies in place address road transport. The aviation industry is also in need of attention.

“The aviation industry is looking for policies that will enable it to implement many of the required technologies and strategies to help it to reduce its carbon footprint. From my point of view, the first thing to do is level the playing field.”

**Dr. Alejandro Rios Galvan, Director,
Sustainable Bioenergy Research
Consortium**

Alexandre Eykerman, Vice President of LNG Solutions, Energy Solutions, Wärtsilä Finland Oy, said that carbon capture technology is available but not accommodated in today's market. He stated that in order to get the right technologies a regulator is needed.

Airlines around the globe are failing to significantly reduce their carbon emissions. The amount of CO₂ emissions from aviation is expected to grow around 3-4 per cent per year. Medium-term mitigation of CO₂ emissions from the aviation sector can potentially come from improved fuel efficiency. However, such improvements are expected to only partially offset the growth of CO₂ aviation emissions.¹⁸

"Many [smaller countries] are not willing to come into CORSIA (Carbon Offsetting and Reduction Scheme for International Aviation) on a voluntary basis because they feel it's unfair. They know the larger Western economies have been able to grow, and to pollute and to have big airlines, while the smaller economies [haven't had] that right. And so there are a number of things that are still in play but [they require] international negotiation and a level playing field." Dr. Alejandro Rios Galvan, Director, Sustainable Bioenergy Research Consortium.

"We need, the IMOs and others or the EPA to implement, to enforce a little bit more in order to get that switch because it will have an economical effect."

Alexandre Eykerman, Vice President of LNG Solutions, Energy Solutions, Wärtsilä Finland Oy

¹⁸ <https://www.icao.int/environmental-protection/Pages/aircraft-engine-emissions.aspx>



THE FUTURE
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Alexandre
Eykerman



THE FUTURE
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Jan Piotrowski





THE FUTURE
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Jason Meininger

Culture

"We are at a critical moment in our world's history right now. There are very few moments in history [which have affected] every single person on this planet. And we have a real moment to come together and solve this, with a new narrative. But that means we have to embrace the solutions for tomorrow to create the future."

**Jason Meininger, Senior Vice President,
Director General Office, Expo 2020 Dubai**



Culture

The term single-use plastic memorably entered the global lexicon in 2018, as a result of the public outrage over the devastating effects of plastic pollution on marine life. In response, the United Nations declared 'war' on single-use plastic, prompting a number of countries to commit to completely phasing out single-use plastics and packaging.

With a growing push from the general public to promote sustainability, behavioural change has been identified as a key driver of the SDGs.

"The problem we have today is mass denial. Mindsets require us to have very different narratives. [These are] not going to be influenced by whether multinational companies decide that they're going to be a bit more sustainable."

Chandran Nair, Founder, The Global Institute for Tomorrow



Timothy Nixon shared insights from a Thomson Reuters study on the 250 largest carbon-emitting, publicly traded companies. “Half of these large firms are responsible for more than 30 per cent of annual anthropogenic emissions. [But] when you dig down into the numbers, what you begin to see is that [many]are actually beginning to decarbonise their business models, which I think is a hopeful sign. And when I say decarbonise, I mean in line with a two-degree world.”

While much more work needs to be done, investment in sustainable development is on an upward trend. Since the UN established and promulgated the 17 SDGs, many different countries have embarked on national agendas aimed at mobilising resources to meet climate targets, preserve and advance their economies, protect the environment and advance social inclusion.

“Indonesia was one of the first countries to introduce a sustainable road map. Brazil and South Africa have pressed ahead with sustainable listing requirements; Kenya uses technology to support greater inclusion, and the UAE has advanced on many different fronts,” said Richard Teng, CEO, Financial Services Regulatory Authority, Abu Dhabi Global Market.

“The response to the call for action on sustainable development has been strong. We have reached a tipping point and we’re going to see much more momentum going forward.”

**Richard Teng, CEO,
Financial Services Regulatory
Authority, Abu Dhabi
Global Market**





It is estimated that around US\$88 trillion is now invested in assets with underlying environmental, social or governance objectives. Larry Fink, CEO of BlackRock, the world's largest asset manager, has stated that the company intends to become a global leader in sustainable investing. To that end, BlackRock launched a range of exchange traded funds last year with the aim of growing the sector from about US\$25 billion in assets to about US\$400 billion over the next 10 years. A similar trend has emerged in green bonds, which have risen from 11 billion issued in 2013, to closer to 200 billion in 2017.

According to Teng, the UN has estimated we will require between US\$50 trillion and US\$70 trillion over the next decade to meet the SDGs. For developed countries, the funding gap is around 10 per cent. However, for developing countries, the gap stands at 40 per cent and up to 90 per cent among the least developed countries in Africa.

"We know, everybody knows now or everybody's realising that something is changing, something is happening."

Francisco Benedito, Co-Founder, Climatetrade

Climate change and damage to the planet's biospheres are largely attributed to human behaviour. Individual-level behaviour change is at the heart of several sustainability campaigns, and there is also increasing awareness that collective action, led by a strong political will, is needed to drive such change.

Traditional fossil fuels will continue to play an important role in our lives – particularly within our transport systems. However, the need to ultimately achieve net-zero emissions loomed large over the discussions at the Future Sustainability Summit.

"The key point here is private sector participation, especially in our region. We've traditionally relied on government to do everything that's important and substantial. We can't rely purely on government, and the private sector needs to be a strong and substantial participant in the shift from legacy infrastructure to new infrastructure."

Samer Chouciar, Director, Crescent Enterprises and Executive Board Member, ION





ExxonMobil's Khurram Gaba elaborated on the current scenario around the world. "We have carbon offset mechanisms in place in Europe, California and China. We're either reducing our emissions or we're paying for emissions that we produce. I think there's broad recognition now that carbon capture will need to be an important part of the solution as we move forward to achieve these long-term climate goals."

Whilst companies are prepared to take on the responsibility for R&D to identify the technologies and make them efficient and affordable, the role of policymakers and regulators must also evolve. "Policy frameworks can either promote or stifle the innovation that's needed and can develop or destroy the business case for these types of technologies," Gaba added.

As populations become more urbanised, much of our transport infrastructure is still designed for the 20th century. For sustainable mobility in urban centres, greater collaboration between governments and the private sector is imperative. As governments realise the power of real-time data, they are likely to find it advantageous to partner with technology companies to solve the efficiency issues that are caused by congestion, just one example of the pressing challenges faced by the transportation sector.

Urban mobility solutions need to factor in the commercial transport industry, which includes the trucking and shipping sectors. Traditionally, tech companies pursue the consumer first as the adoption curve is much higher and it pays back quicker. However, the commercial piece of the transportation puzzle is ripe for disruption.

“If one considers the success of AirBnB and people renting out their homes; even as recently as 15 years ago, it would have been unheard of for people to welcome and rent out their homes to strangers. Similarly, if we extrapolate that in terms of another asset of people, time in their day-to-day lives, there may be an app that allows us to take a package from one person and deliver it to another for a little bit of extra money,” said Daniel McMurray, Chief Catalyst, Global EVRT.





Bassel Al Nahlaoui, Managing Director, Gulf, Careem, anticipates some degree of convergence between the commercial and consumer transport sectors. “If you think of Careem, it’s a transport network that spans the entire region – 125 cities and growing. These are people with cars, private cars that are moving around across whole cities. This is something that’s starting to be explored,” he said.

With data becoming increasingly available, the industry is rapidly becoming aware of the inefficiencies. It is estimated that approximately 40 per cent of sea freight containers moving around the world are actually empty¹⁹ and 40 per cent of all e-commerce orders globally actually end up with a return because of errors in the scheduling and delivery.²⁰ “Imagine that sort of inefficiency on a global scale. The world is moving towards more instant delivery, especially for last mile e-commerce. Once the inefficiencies are addressed, you can time things a lot better and reduce some of the costs associated with it,” said Nahlaoui.

¹⁹ Samer Chouciar, Director, Crescent Enterprises and Executive Board Member, ION, The Future Sustainability Summit

²⁰ Bassel Al Nahlaoui, Managing Director, Gulf, Careem, The Future Sustainability Summit



ABU DHABI
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DEPARTMENT OF ENERGY



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مسدر
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Leadership

“You recognise the diversity of the people who inhabit planet Earth and know that all inhabitants must work together if planet Earth is to endure and flourish. Your tolerant embrace of global diversity encourages the empathy and compassion necessary for understanding and cooperation.”

**HE Sheikh Nahyan bin Mubarak Al Nahyan,
Minister of Tolerance, UAE**



Leadership

When 15-year-old Greta Thunberg protested against climate change for the first time in September 2018, she might not have expected her actions to snowball across the world. From inspiring thousands of schoolchildren to protest in Australia, Canada, Finland, Germany, Ireland, Switzerland and in their largest numbers in Belgium, to a group of children suing the US government over climate change. It appears that a new kind of leadership is emerging in the conversations around protecting the planet.

Climate change was high on the agenda at the Future Sustainability Summit, with political and industry leaders acknowledging that the world needs to take bold measures to address the challenge.

"I think every individual, at the end of the day, is a leader in themselves and this is a challenge that the entire global community faces. Each individual has the ability to do something for future generations to come."

HH Sheikh Zayed bin Sultan bin Khalifa bin Zayed Al Nahyan, Chairman of the Board, Alliances for Global Sustainability

Case Study **The Mohammed bin Rashid Al Maktoum Solar Park, Dubai**

The Mohammed bin Rashid Al Maktoum (MBR) Solar Park in Dubai is deploying renewable energy at scale. On completion, it will be the largest single-site solar park in the world, with a total capacity of 5,000MW by 2030. A consortium including Masdar is developing the mega-project's third phase. At 800MW, it will power an estimated 160,000 Dubai homes while displacing over 1.4 million tonnes of CO2 emissions per year. The first 200MW stage of the expansion came on stream in April 2018, becoming the largest solar power plant in the world with technology capable of tracking the path of the sun, and the first of its kind in the Middle East.

Ban Ki-Moon, the former UN Secretary General and Chair of the Council for the Global Green Growth Institute, identified that each and every member state will have different priorities and different means of implementing the SDGs.

“Some countries like the United Arab Emirates with sufficient resources have quite a balanced way of addressing the issues; but there are many poor countries who do not have enough resources, and they may have to prioritise their targets.”

Ban Ki-moon, Former Secretary General, United Nations and President of the Assembly & Chair of the Council, Global Green Growth Institute



Public opinion towards climate change is shifting dramatically. Climate change is seen by more countries as a top international threat. For example, in 2013, before the Paris climate accord was signed, a median of 56 per cent across 23 countries surveyed said global climate change was a major threat to their country. That figure rose to 67 per cent in 2018.²¹

Since 2013, worries about the climate threat have increased significantly in 13 of the countries where data is available. The biggest increases have been in France (up 29 percentage points) and Mexico (up 28 points), but there have been double-digit rises in the U.S., UK, Germany, Spain, Kenya, Canada, South Africa and Poland as well. Most recently, in the United States, 73 per cent say that climate change is real and serious – the highest percentage since the question was first asked of them in 2008.²² However, a majority of Americans were unwilling to spend even US\$10 a month to address the global warming challenge.²³

Unsurprisingly, the awkward question of who picks up the bill for sustainable solutions featured prominently during the Summit's discussions, with leaders across the business and industry spectrum agreeing that costs were proving to be a deterrent in the widespread early adoption of green-tech.

“There are some great water technologies today, which can prevent [depletion] of water resources in major cities. But they are too expensive for a lot of governments to implement today. That might not be the case in the future. That might change. Why? Because people are investing in the technology. They will make it cheaper. So even though someone takes [most] of that initial expenditure, at the end of the day, a lot of cities around the world will benefit.”

**HH Sheikh Zayed bin Sultan bin Khalifa bin Zayed Al Nahyan,
Chairman of the Board, Alliances for Global Sustainability**

²¹ <http://www.pewglobal.org/2019/02/10/climate-change-still-seen-as-the-top-global-threat-but-cyberattacks-arising-concern/>

²² <http://climatecommunication.yale.edu/publications/climate-change-in-the-american-mind-december-2018/3/>

²³ http://www.apnorc.org/projects/Documents/EPIC%20fact%20sheet_v4_DTP.pdf

THE FUTURE SUSTAINABILITY SUMMIT





The debate on the need to switch to green technologies as soon as possible prompted a passionate discussion among the Summit delegates, with some advocating an idealistic approach and others advising pragmatism.

Energy consumption in Asia, the Middle East, and Africa continues to grow rapidly, with about 20 per cent growth witnessed in each region between 2010 and 2016²⁴, fuelled by increasing populations, economic development and greater access to energy markets. This trend is likely to continue.

The Saudi Minister for Energy, Industry and Mineral Resources His Excellency Khalid bin Abdulaziz Al-Falih explained the Kingdom's strategy to adopt cleaner fuels, improve the efficiency of the country's power and water desalination sector, and to introduce renewable and nuclear energy.

"Balancing greenhouse gas emissions and sinks will take decades. It's not going to be done overnight. In the interim, ample and reliable energy sources like oil and gas will need to be made available or we risk chaos. If the world can accept that reality, we can focus our combined attention on improving the carbon performance of conventional energy, as well as accelerating the uptake of renewable energy and substitute technologies as they become feasible and deployable at scale, around the world. In Saudi Arabia we're doing both at scale."

**HE Khalid bin Abdulaziz Al-Falih,
Minister of Energy, Industry and
Mineral Resources, Saudi Arabia**

²⁴ <https://www.eia.gov/todayinenergy/detail.php?id=37932>



According to H.E. Al-Falih, the Kingdom is making steady progress in improving its power system efficiency while attracting significant and sustainable private investment flows.

Over the next decade, Saudi Arabia aims to be a global hub of renewable energy capability. In 2019 alone, at least 12 projects are tendered to stimulate investor manufacturing and development activity across the entire value chain. This are coupled with the private uptake of rooftop solar, in addition to various other large-scale projects. Additionally, Saudi Arabia will begin to introduce nuclear power into the mix, initially with two reactors in the next decade with a combined production of 2 to 3.2 gigawatts.

“Talking about breakthrough prices, I want to take a moment to acknowledge and congratulate Masdar, who along with their consortium partners, were awarded Saudi Arabia’s first utility scale 400 megawatts onshore wind farm, and have set a new record in the cost competitiveness of wind power generation.”

**HE Khalid bin Abdulaziz Al-Falih,
Minister of Energy, Industry and
Mineral Resources, Saudi Arabia**



Saudi Arabia is also developing close to 60 gigawatts of renewable energy capacity, out of which 40 gigawatts will be photovoltaic cells, three gigawatts will be concentrated solar power and 16 gigawatts will be wind. To achieve this, the Ministry of Energy, Industry and Mineral Resources and the Public Investment Fund (PIF) are working together. PIF and its selected partners will develop 70 per cent of the total renewable energy capacity with the objective of accelerating localisation of Saudi manufacturing capability.

Meanwhile, the Ministry will continue to drive breakthrough prices for the Kingdom by competitively tendering the remaining 30 per cent of the capacity.

Furthermore, H.E. Al-Falih added that the energy strategy must be "fair to all and not curtail the right to development for developing nations."

"If anything, energy poverty and economic challenges deserve special consideration. Policymakers and regulators must be agnostic when determining the future mix of technology options and let markets decide on a well-to-wheel basis and on a level playing field."

**HE Khalid bin Abdulaziz Al-Falih,
Minister of Energy, Industry and
Mineral Resources, Saudi Arabia**



Representing the African point of view, President Ibrahim Boubacar Keita from the Republic of Mali and President João Lourenço from the Republic of Angola laid out the realities of developing nations that are often faced with having to choose between sustainability and development. Together, Mali and Angola have a population of 50 million and GDPs of US\$15.3 billion and US\$124 billion respectively.

The African continent is home to 54 countries, each of which is distinct and diverse. It accounts for 1.3 billion people, 60 per cent of whom are under the age of 25, and six of the ten fastest growing economies in the world are African, making the region an important stakeholder in the sustainable development narrative.

Malian President Keita elaborated on the challenges faced by his country specifically. He described the critical challenge of desertification and the shrinking of the Niger River, which is one of the main sources of life for Mali. The consequences for people and animals have been devastating. Mali has one of the largest livestock populations in West Africa and the common rangelands that fed the livestock are fast disappearing, which he says is impacting inter-communal relationships between shepherds, nomadic herders and settled farmers, who are all competing for the same grazing lands in the northern and central parts of the country.

Climate change in Mali is further affecting the security situation as it impacts natural resources, increases the stress on water, land and hurts agricultural output. As the pressure on land and water increases, communities are being forcefully displaced and left vulnerable to recruitment by radical armed militias. The UN Security Council has acknowledged that climate change can lead to instability in the Sahel and West Africa region.²⁵

“Global warming is not a theoretical problem, it is a reality that we actually live in,”

HE Ibrahim Boubacar Keita, President, Republic of Mali

²⁵ https://www.clingendael.org/sites/default/files/2018-06/PB_Climaterelated_security_risks_in_Iraq_and_Mali.pdf



Mali, a leading cotton producer south of the Sahara, is the third highest gold producer after South Africa and Ghana. However, in spite of its high cotton production, the recovery of surplus value is not visible, as only 2 per cent of the cotton is transformed on the spot. President Keita attributes this to the country's enormous energy deficit.

"We are one of the sunniest countries in the world, meaning solar energy; we have two large river systems - the Niger at 1700 km and the Senegal River at 800 km which could help us with hydropower development; we also have the wind of the Sahara zone with a wind speed that goes 7 to 5 meters per second. We have a capacity of 1,150 megawatts, but, we have only used 31 per cent of it."

HE Ibrahim Boubacar Keïta, President, Republic of Mali



One of the key outcomes of the Summit's discussions was the agreement for nations to create an integrated portfolio of policies that involve both mitigation (avoiding greenhouse gas emissions) and adaptation (coping with the impacts of global warming).

Campaigners focus on mitigation as do businesses, countries and NDCs (national deterrent contributions). The Paris agreement attempted to place equal onus on adaptation. Reflecting on the details and nuances, the UAE's Minister of Climate Change and Environment, His Excellency Dr. Thani bin Ahmed Al Zeyoudi, offered a view of the country's strategy.

"In our submissions [Paris agreement], we did not focus on mitigations. Adaptation was a huge part of the submissions," he said, "The countries in the Gulf region are just as vulnerable to the effects of climate change – to heatwaves, rising sea levels, changing wind patterns which might affect the way that airports work and fresh water availability."

"In 2017, we launched the UAE 2050 Climate Change Plan and one of the main [aspects] of it is adaptation. 2018 was the year of detailing our plans for adaptation."

HE Dr. Thani Al Zeyoudi, Minister of Climate Change and the Environment, UAE

Water, which remains a vital resource for the region, remains a top priority for investments in renewable energy and research on technologies that convert humidity to water, as well as cloud seeding, which has been an area of focus over the last four years.

On the environmental front, adaptation has been a strategic focus; for example, through the expansion of mangrove plantations, which have benefits such as increased carbon storage and storm surge protection. Through interventions in water and on land, the minister said that “fishery stocks are going up based on the last surveys, not only [through] regulation but also by putting back some of the artificial caves and planting more coral reefs in the sea.” Successful breeding programmes have resulted in an increase in the numbers of Arabian oryx, the tahr, falcons and houbaras.

A new approach to master planning is reintroducing traditional building methods, such as building homes closer together to make sue of natural shade and to improve air circulation.

“To transform the UAE into a knowledge-based economy from a space perspective, we are establishing government-to-government partnerships, as well as public-private partnerships to ensure maximum benefits to humankind. And one of the most important considerations is the contribution to sustainability.”

Dr. Mohamed Al Junaibi, Executive Director, Space Sector, UAE Space Agency





“Masdar is an excellent example. We also have a Sustainable City in Dubai and we’re now expanding it through the national programs of communities that we’re building. Any project in Abu Dhabi has to be at least 1.2 meter above the sea level from the beginning and we’ve done it systematically without disturbance. It has been implemented and now we’re going to expand it to the rest of the country,” he said.

With climate change and energy featuring prominently throughout the Summit, Armenian President Dr. Armen Sarkissian, who is also a physicist, scientist and author, delivered an inspiring speech that traced the journey of our energy sources “from black to grey to green”, and noted that although the promise of a green future is reassuring, it will require extraordinary effort. Referring to Artificial Intelligence as the brain of the current Industrial Revolution, he pointed to the countries and companies that are investing in AI as pursuing a future-secure path. “AI is going to change the way we handle our problems: the food, the water, the energy and at the end of the day, our jobs. The core of human activity will become innovation,” he said.

Consequently, there is a renewed worldwide interest in space technologies, as their widespread applications across multiple sectors have the potential to address challenges that are impacting food security, climate change and human displacement.

The UAE government’s leadership in capacity building is evident through the 2021 Emirates Mars Mission and 2117 Mars Strategy, whose ultimate goals are to inspire science-led missions that benefit humankind, the Arab world and the UAE.

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