

THE CHALLENGE OF WATER OUR NET POSITIVE JOURNEY

LEADING BY EXAMPLE: SUSTAINABILITY THOUGHT LEADERSHIP SERIES





DARE TODAY

CHANGE TOMORROW

A way of life for a positive future



We **DARE TO** rethink our use of resources to make a Net Positive Impact



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FOREWORD



When we talk about Net Positive Water, the end goal is our ambition. However, it is the journey we make that will solve many of our region's problems."

Ibrahim Al-Zu'bi
Chief Sustainability Officer
Majid Al Futtaim - Holding

WATER IS LIFE

Water is essential for life on our planet. It is crucial for food production, integral to our daily lives and essential to our business operations. However, the region in which we operate is extremely water-stressed. We are now withdrawing water from our natural resources faster than it can be replenished. In order for us to continue creating great moments for everyone, everyday, we need to ensure that our business and water-use is sustainable.

RETHINKING RESOURCES

Earlier this year, we launched our ambitious sustainability strategy, *Dare Today, Change Tomorrow*. Our strategy has been developed to address the issues that matter most to our business and stakeholders. It has been aligned with internationally recognised frameworks, including the United Nations Sustainable Development Goals, and it seeks to demonstrate best practice.

Dare Today, Change Tomorrow is arranged into three focus areas; Transforming Lives, Empowering Our People and Rethinking Resources. It is through this last focus area that we will tackle our carbon emissions, look to better support ecosystems around us, adapt to the changing climate and embed circular economy principles into our waste management practices. It is also through Rethinking Resources that we will tackle our water consumption – we have made an ambitious commitment to become Net Positive in Water. By 2040, we will ensure the availability of more clean water than we consume across our operations, developments and tenants' activities.

We seek to make a real contribution to the betterment of our region through proactive management of our resources. Our goal is to make our business operate sustainably, by contributing to, rather than depleting, our natural resources and to use our wider influence to forward sustainability in the region.

COLLABORATION IS KEY

In this white paper, we begin to set out some of the opportunities and challenges that we face on the road to Net Positive Water. It comprises the first in a series of white papers to explore the complexities of Net Positive Water. Here, we discuss just some of the solutions that an organisation can explore to achieve sustainable water-use. Most importantly, the emphasis in this paper is on the need to collaborate – water is ultimately shared across buildings, communities, cities and countries and some of the solutions outlined here are only feasible with cooperation between these entities. At the moment, we are working to implement water-efficiency improvements in our operations, but this is also a crucial time to start setting up strategic partnerships and support development of policies which encourage and facilitate collaboration in our region in order to achieve the ultimate goal – Net Positive Water.

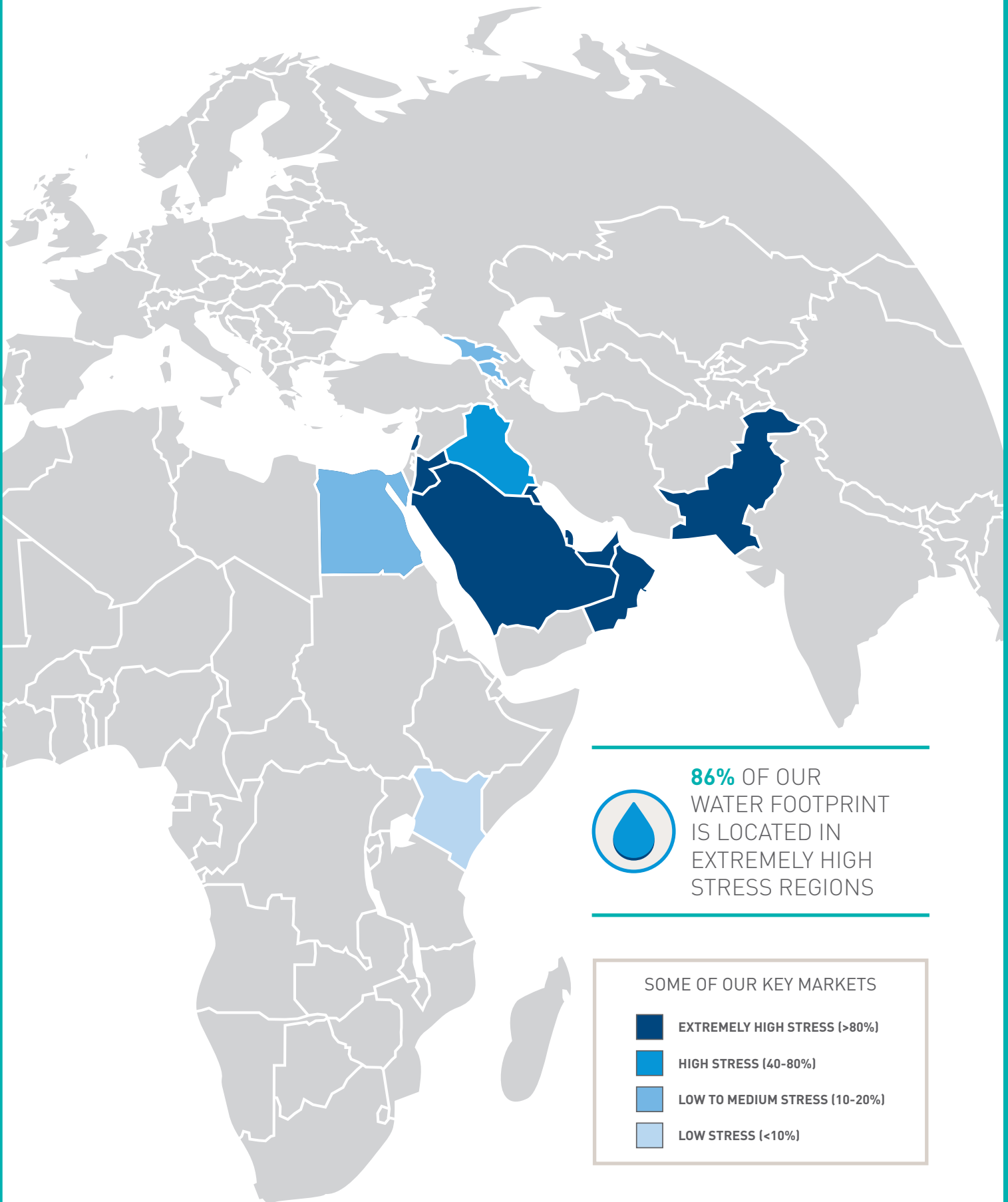


For the first time in the history of humanity, for the first time in 500 million years, one species has the future in the palm of its hands. I just hope he realises that is the case."

Sir David Attenborough
Blue Planet II

WATER IN OUR REGION

WATER STRESS BY COUNTRY MAP¹



By 2025, it is estimated that an additional 100 million people will be affected by water stress².

WATER SCARCITY IN OUR REGION

We operate in 15 countries across the Middle East, Africa and Asia, but the majority of our business operations and our water footprint are concentrated in the Middle East and North Africa (MENA). MENA is the world's most water-scarce region³ with 14 of its 33 countries projected to be among the most water-stressed countries in the world by 2040⁴. Despite this, parts of the region have some of the highest per capita water consumption rates in the world⁵.

A large part of this demand has traditionally been met through withdrawing water from the ground and surface water bodies but these resources are being used faster than they can be replenished and are becoming increasingly depleted. The amount of ground and surface water available in the Middle East has fallen by 75% since 1950 and some sources predict that Saudi Arabia will run out of ground and surface water before 2030⁶.

Many areas in the region are prone to drought or flooding events with floods adversely affecting surface water resources through contamination with pollutants or saltwater. Furthermore, there is a projected decrease in the amount of rainfall in the region, which will result in more drought events and further depletion of surface and ground water resources.

WATER SITUATION AT PRESENT

A very small proportion of demand is met through unconventional water sources (non-ground and surface water sources). At present this amounts to only 3.6% of the total water-use in the Middle East⁷. Despite this relatively low level of contribution to supply, the MENA region has the greatest share of desalination capacity in the world⁸.

With the highest domestic water consumption rates in the world, many governments and businesses in the region are starting to invest in education and other measures to reduce domestic water-use^{8,9,10}.

However, it is agricultural irrigation that requires the most water in our region, with 85% of total

ground and surface water withdrawals going towards meeting this need⁵.

Wastewater management is another area with many challenges and opportunities. Wastewater poses significant environmental risk if left untreated, affecting the safety of freshwater resources and polluting our oceans and waterways¹¹. However, when appropriately treated, wastewater represents a valuable resource that can be used effectively for agricultural irrigation, reducing the high demand of this sector on increasingly scarce freshwater supplies.

What is also clear is that we need to address water issues at a regional rather than country level. Some ground and surface water resources, such as aquifers and rivers, are shared across political borders. What we take from them and put into them affects many people beyond only our own surroundings. Currently, there is no single basin-wide treaty in place in the MENA region, resulting in uncoordinated extraction of water, and depletion of resources, by many countries¹².



- The MENA region has the greatest share of desalination capacity in the world at 46.7%⁸
- Ground water and surface water account for 96.4% of total water withdrawal in the Middle East⁷
- Out of the total water-use in the Arabian Peninsula, 8% is desalinated and 2% is treated wastewater⁷

OUR WATER CONSUMPTION IN 2017

IN 2017, WE CONSUMED



7,288,586

CUBIC METRES OF WATER IN OUR OPERATIONS

THIS IS ENOUGH WATER TO FILL THE GREAT PYRAMID OF GIZA 2.8 TIMES



HEIGHT OF AN AVERAGE HUMAN

WATER IN OUR OPERATIONS

Majid Al Futtaim's wide range of activities means that we have a large and complex water footprint in a severely water-stressed region. We use water to cool many of our buildings, to prepare food in our restaurants and kitchens, to service guest facilities in our hotels, to irrigate our plants and as a vital component in the construction of our buildings.

Nearly 90% of our water footprint occurs in countries which are considered to be under extremely high water stress by the World Resource Institute. Other countries we operate in have their own unique challenges, from flash floods in Egypt to high reliance on unprotected water sources in Kenya.

While water scarcity poses a significant risk to lives and businesses in the region, our geographical scope and range of operations puts us into a unique position to drive water sustainability, innovate and share best practice on a regional level.

We have made the significant commitment to become Net Positive in water for all of our operational, development and tenant activities by 2040. To reach our goal we will have to challenge ourselves to use less and be innovative in sourcing the rest. This, the first in our series of Net Positive Water white papers, outlines some of the options we, and other businesses, could explore on the journey to sustainable water-use.



POLICY HORIZON

Governments in the MENA region are responding to the current and projected water crisis, placing a growing emphasis on the importance of water in national strategies.

They are introducing long-term frameworks for water management and policies to support reductions in water-use and conservation. Many of these are focusing on improving existing water infrastructure and reducing the loss of water from pipelines and reservoirs.

There is also a strong emphasis on improving irrigation and wastewater treatment to reduce pollution from untreated sewage and reduce freshwater demand for irrigation^{10 13 14}. Wastewater is becoming a valuable resource in the region with governments and businesses exploring wastewater treatment, capture and re-use. One example of this is in Jordan where treated wastewater has been used not just for irrigation, but also to recharge local aquifers.

Countries lacking access to freshwater, but with good access to saltwater are largely transitioning to desalination to secure their water supply. The UAE is at the forefront of this transition, and it is projected that 81% of its total water needs will be met through desalination by 2025¹².

RISKS AND OPPORTUNITIES FOR THE PRIVATE SECTOR

With projected water shortages, businesses face a real risk of not being able to obtain sufficient water for their business-as-usual operations. To address this, businesses need to work hard to be efficient with their use of water and drive cultural change in their stakeholders to reduce water-use.

Increasing amounts of regulation designed to address water shortages are also an opportunity for businesses to drive innovation around sustainability. Governments in the region have demonstrated an appetite to work with the private sector to achieve the goal of sustainable water-use in the region.

Irrigation efficiency is estimated to be only 51% in MENA. Raising this to 70% would save 50 billion cubic meters of water annually. That is almost 7,000 times more than Majid Al Futtaim's entire operational water footprint¹⁵.

OUR WORLD OF WATER

WATER-USE

FOCUS ON REDUCTION | The first step on the journey to Net Positive Water is to use water more efficiently and reduce how much we need. This involves technological solutions, behavioural change and efficient building design. However, no matter how efficient we get, we still need to use water. That's why we need to explore other approaches to water supply like water treatment and re-use or desalination.

WASTEWATER

FOCUS ON TREATMENT AND RE-USE | Wastewater is an overlooked resource that, with appropriate treatment, can be turned into water fit for any purpose – from irrigation to drinking water. Re-using greywater from laundry, sinks and showers provides an alternative source of water for processes that do not require drinkable water. This allows us to re-use the same water many times.

On the road to Net Positive, greywater and black water provide interesting opportunities to put both internally and externally generated wastewater to practical use and reduce our demand for freshwater.

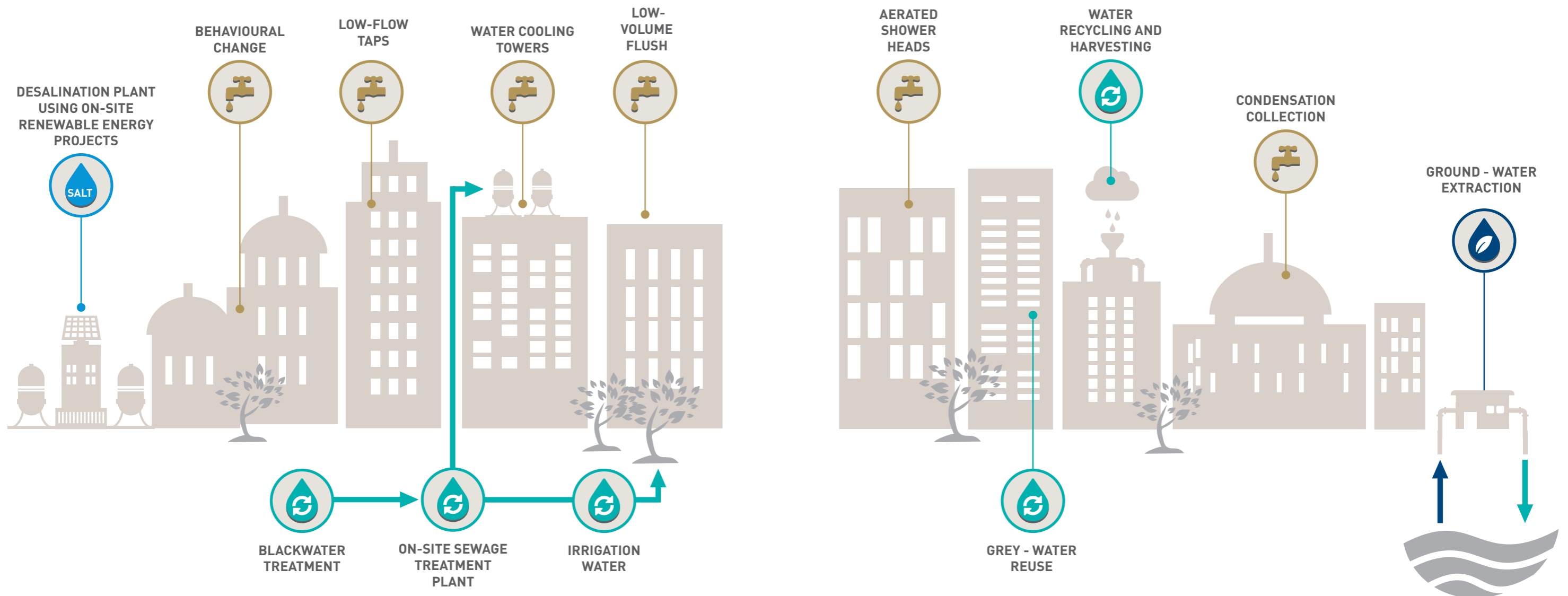
FRESHWATER

FOCUS ON BALANCED USE | Freshwater (or ground and surface water) is the most conventional sources of water and it covers most of our day-to-day water usage. However, the amount we extract from the ground must be carefully managed to prevent over-extraction. Mismanagement of these resources can cause water courses to dry up, affecting local biodiversity, allow saltwater intrusion into the ground, contaminating the ground water, and can even result in the sinking of land, destabilizing buildings and raising the risk of flooding.

SALTWATER

FOCUS ON DESALINATION | Desalination provides a climate-independent source of water that reduces water stress in the region. Seawater is abundant and tapping into this resource has the potential to provide a real solution to part of the water scarcity problem. However, this process is expensive and energy-intensive, and requires careful planning and collaboration. Desalination can be used to prevent excess water withdrawals from freshwater resources and to provide security of supply.

FIGURE 1: OUR ASPIRATIONAL WATER PRACTICES



WATER-USE

FOCUS ON REDUCTION



Water is in high demand and is a highly strained resource in the region. The first and most important step to take is to focus on efficient use of water. We can achieve this by changing the technology we use and encouraging changes in the behaviour of our employees and customers.

Water - saving equipment like waterless urinals, sensor taps and aerated shower heads help reduce the water footprint of every user without additional effort or significant changes in their behaviour. In many instances, technologies like these can even make facilities more convenient and enjoyable to use.

By adjusting processes to work with, rather than against, the surrounding environment, we can optimise how and when we use water, leading to significant savings. By analysing data to identify trends, and by using live data feeds, we can adapt our processes to changes in the environment. For example, by irrigating plants early in the day while it is cooler and less windy, we lose less water to evaporation.



OPPORTUNITIES

- Water-efficiency measures mean we buy less water and lead to direct financial savings for our business.
- Leading by example – showcasing water-efficiency measures can encourage others to use them too.
- Large organisations can achieve significant savings by scaling up simple water-efficiency measures or rolling them out across multiple sites.
- We can include water-efficiency measures in the design of all new developments, making them more efficient users of water right from the start.

CHALLENGES

- Balancing water-efficiency with the customer experience.
- Retrofitting old buildings with water-efficiency technology to significantly reduce their water consumption.
- Changing water-use behaviour of our employees and customer is challenging due to high temperatures in our region.
- Changing the public perception towards water - efficiency measures so they aren't seen as inconvenient.

CASE STUDY

MAJID AL FUTTAIM WATER SAVING EQUIPMENT

We have been continuously investing in water-efficiency technology in our facilities. We have recently completed major waterless urinals projects in the UAE, Oman and Bahrain. We are also installing numerous sensor taps with water-flow reducers. While these installations provide direct water savings, they also showcase sustainable water technology to our staff and customers to support our Net Positive Water commitment through raising awareness.

ADJUSTING IRRIGATION TO OUR CLIMATE

Adjusting the irrigation timers to suit the changing climate conditions ensures that the landscape receives sufficient irrigation water. This simple process reduces our water footprint, provides direct financial savings to our communities and ensures lush landscape within the communities. Combined with re-using water from our sewage treatment plant in Al Zahia, this allows us to minimise our water footprint for irrigation.



FRESHWATER FOCUS ON MANAGEMENT



Freshwater in the MENA region is water withdrawn from ground water or surface water resources. It is typically provided to customers through centralised water networks but can also be extracted from boreholes on-site. It is our over-reliance on freshwater that exposes our region to water stress. The natural replenishment rate of our ground and surface water resources cannot meet demand.

There are also many instances where aquifers or surface water resources are shared between countries and regions, but where there are no agreements in place to regulate use between all parties who withdraw from that water source.

Tapping into freshwater resources is not fundamentally problematic, but the scale of water withdrawal needs to be carefully managed to ensure sustainable and fair access for everyone. Water levels need to be maintained and resources need to remain unpolluted.

A diverse and dynamic approach to water supply could be used to ensure that there is enough water to meet demand whilst also protecting and maintaining freshwater resources in a country, region or reservoir. To achieve this, countries need to ensure that sufficient water treatment capacity is available to provide water from unconventional sources at times when freshwater sources are under particular stress.



OPPORTUNITIES

- Development of regulatory frameworks to maintain sustainable freshwater resources.
- Installing water treatment capacity to relieve pressure on freshwater withdrawal.
- Enhancing responses to extreme weather events by developing adequate storage.
- Separate water price bands based on intended use to cover the costs of more expensive infrastructure.

CHALLENGES

- Effects of extreme weather events on freshwater resources.
- Putting in place effective solutions to replenish already over abstracted freshwater sources.

CASE STUDY

RESPONSIVE WATER SOURCING

The Sydney Desalination Plant has clear operating rules, which allow for the production of drinking water through desalination when the Sydney catchment storage levels fall below 60%. When storage levels return to 70%, desalination processes are suspended. This plan ensures that this otherwise expensive method of drinking water production is only used to top up water resources when necessary to protect the ground water resources and local aquifers¹⁶.



SALTWATER

FOCUS ON DESALINATION



Covering 70% of the surface of the earth, saltwater is an abundant resource. However, it is not suitable for drinking, most agricultural uses and many industrial processes. Desalination is the process of removing salt from sea water, creating clean water suitable for use.

Desalination provides a climate-independent source of water for critical human needs and economic development. It is an effective way to secure water supplies against the effects of a growing population, climate change and drought. While there are many technological approaches to water desalination, they all tend to be energy intensive and carry some additional environmental risks.

The amount of energy required is a major drawback and can make the process expensive. If fossil fuels are used to generate the energy necessary for desalination then the resulting clean water comes with a high carbon footprint.

Desalination also produces brine which is around twice as salty as normal sea water. When this is released back into the ocean, it can negatively affect the surrounding environment if it isn't managed carefully, something which is already being experienced in the Arabian Gulf.

The Arabian Gulf and the Gulf of Oman are also particularly notable as being susceptible to algal blooms. If these occur near the intake of the desalination facility they can cause blockages and shut down of operations, or potentially release toxins into the water, making it unfit for human consumption. Given the resource-intensive process and potential for environmental pollution and damage, it is essential to have rules in place to ensure efficient and safe processes. A strong regulatory framework can be used to setup control mechanisms for managing different sources of water and to make desalination a more sustainable process, with plants running on renewable power and proper waste treatment procedures in place.



OPPORTUNITIES

- Desalination is an effective alternative to surface water and groundwater that would reduce water stress in the region and could prevent the negative ecological effects associated with over-abstraction from these sources.
- Combining desalination with renewables such as wind turbines or solar panels could lead to a carbon-neutral water treatment process, moving towards a truly sustainable water source.

CHALLENGES

- Desalination is geographically limited – piping saltwater to an in-land treatment plant for desalination would add significant cost to the operation, so treatment is typically based close to the coast.
- The location of desalination plants must be carefully chosen for proximity to major areas of water-use and where ocean currents are sufficient to ensure the dispersion of brine, which is released back into the ocean as a by-product of the process.
- Algal blooms can affect water quality and threaten desalination plant operation. Understanding the cause of the blooms and mitigating their impact is an ongoing area of research.

CASE STUDY

'GREEN POWER' DESALINATION PLANTS

The high energy intensity of the process means that many desalination plants in Australia use accredited 'Green Power' - using wind energy or electricity generated by solar to power desalination plants. This in turn reduces greenhouse gas emissions and contributes to a carbon-neutral process. New technologies are increasingly reducing the construction costs of renewable energy-powered desalination plants, making them commercially viable for not only large-scale municipal water treatment organisations, but also for other organisations for use in their own operations¹⁷.





WASTEWATER

FOCUS ON RE-USE AND TREATMENT

Greywater is wastewater generated from bathtubs, showers or bathroom sinks and is collected separately from a sewage flow. As a result, greywater requires relatively light treatment to make it fit for re-use.

Being able to re-use water in this way makes it possible to remove or largely supplement potable water in processes that do not require water of that quality, for example in flushing toilets, running cooling towers or doing laundry. This not only reduces costs for the business, but it also reduces pressure on water supply networks. While new developments can be built with grey-water capture and reuse infrastructure, it can also be retrofitted into some buildings.

Blackwater is wastewater which carries sewage. Typically thought of as a waste product to be disposed of, black water can also be a valuable resource, as a source of water, nutrients and energy. By processing blackwater in an on-site sewage treatment plant, we can produce clean water which can then be used for irrigation, industrial process or for other greywater applications. Treatment of blackwater can be done on both small and large scale, and can also result in the production of valuable co-products such as fertiliser and energy.

Infiltration of treated wastewater into surface waters or groundwater can expose it to natural processes such as filtration, adsorption, UV exposure and similar. These processes can effectively clean treated wastewater for future potable use. This is a feasible, low-cost solution to refill natural surface and groundwater resources but requires strict monitoring in place to achieve compliance.

OPPORTUNITIES

- Re-using water multiple times within the same building, reducing water demand in the local area and on local water sources.
- Eliminating costly, potable water from processes that do not require it, such as irrigation, cooling towers and other industrial processes.
- Wastewater to replenish aquifers – sufficiently treated wastewater can be used to effectively replenish surface and ground water resources.
- Wastewater to energy – recovered biogas from wastewater treatment can be used for on-site generation of heat and electricity.
- Wastewater to fertilizer – technology required for recovering nitrogen and phosphorus from sewage is becoming more advanced and can be used to create more stable fertilisers as a valuable by-product of the treatment process.

CHALLENGES

- Installing infrastructure for greywater capture, disinfection treatment (typically with chlorine, ozone or UV) and re-use in existing buildings, while ensuring no cross-contamination with potable supplies.
- Installing on-site black water treatment given space constraints in some locations and the need to size for both efficiency and increases in demand over time.
- Public perception surrounding the use of treated wastewater is still negative in some regions, despite its use becoming increasingly common across the globe.
- Increased utilisation of wastewater over time may lead to competition and an increase in cost for this resource.
- Appropriate regulation on the use of wastewater – countries in the MENA region are developing policies and regulations in this field but much of this is still in its infancy.

CASE STUDY

SHERATON DUBAI, MALL OF THE EMIRATES HOTEL

We have established a greywater capture and re-use process in Sheraton Hotel. We collect up to 70 m³ of greywater per day from the hotel's sinks and showers and re-use it in the cooling towers. This brings us financial savings across the year as well as reducing our environmental impact in an extremely water-scarce region.

SEWAGE TREATMENT PLANT FOR AL ZAHIA COMMUNITY

We have installed a sewage treatment plant in our Al Zahia Community. We directed the flow of the sewage from our community into the plant and returned the water into the irrigation systems for the community landscape. Currently, we can cover about 25% of our irrigation needs through treated wastewater, therefore providing direct savings to our community and reducing the use of underground water supply. Furthermore, operating a sewage treatment plant covers all of the sewage disposal needs for our community.

CITY CENTRE ME'AISEM

The mall is fitted with its own on-site sewage treatment plant, treating black water from the mall and generating enough clean water to meet our irrigation needs on site.

SAN FRANCISCO MICRO-MARKETS

In 2012, the San Francisco Public Utilities Commission has made it compulsory for all new developments, over 250,000 sq ft, to install and operate an onsite non-potable water system to treat and reuse available greywater, blackwater, rainwater, and foundation drainage for toilet and urinal flushing and irrigation. Realignment of government policies has led to the emergence of new micro-markets in support of this, allowing two or more buildings to share, buy or sell water between them.”¹¹

THE FIRST FULL-SCALE DIRECT POTABLE RE-USE APPLICATION

Windhoek in Namibia has been running a wastewater reclamation plant since 1969. The water quality produced by the plant has consistently met drinking water standards for over 40 years, showcasing a successful application of direct potable re-use. A new plant showcasing a significant technological upgrade has replaced the old facility since¹¹.



DRIVING OUR AMBITION FORWARD



Net Positive Water is a very ambitious goal, one which is made all the more challenging due to the geographical and temporal constraints which accompany it. Increasing water stress in the region is occurring as the result of withdrawing more water than can naturally be replenished. To reduce this stress, we need to reduce the amount we withdraw and possibly even take the next step of replenishing the aquifers. It requires a careful balancing act of reducing, re-using, and treating in order to satisfy our water needs without negatively impacting the environment.

There are many tools at our disposal to achieve this. We can reduce how much water we need in the first place, installing water-efficient technologies in our buildings and changing our behaviour. We can capture and treat wastewater, reducing the need to extract more from freshwater sources. We can use abundant saltwater resources to create freshwater through desalination. Nature is able to perform filtration and cleaning of water on its own, if we control the quality of wastewater that we return to the environment to replenish freshwater resources.

Some solutions are only feasible on a large scale, across cities, countries or entire regions, while others are best suited at a building or community level. Achieving an ambitious goal like Net Positive Water is not possible in isolation – many entities need to come together in a balanced approach as different private and public organisations all have a role to play.

At Majid Al Futtaim, we will drive our Net Positive ambition forward through adoption, into our design and operations, of some of the measures discussed in this paper. In 2017 alone we reduced the water footprint of our business by 2%, but we know that this is not enough. We will look to continuously improve, investing in water-efficiency, re-use and treatment solutions appropriate to the regions in which we operate.

We will explore the ways in which we can influence the behaviour of our stakeholders, encouraging and incentivising our customers, employees and suppliers to use less.

Our Innovation Hub will empower individuals and small businesses to develop and trial innovative solutions. We will collaborate with academia and think tanks to spearhead and drive water management strategies in the region forward.

We will work with local, national and regional government bodies to support the generation of regulatory frameworks and policies to underpin the right legal environment for good water management.

But, our most important role is to create a platform for businesses and public institutions to work on the issues of sustainable water management together. Together, we can be Net Positive Water.



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