

FIFA World Cup Qatar 2022™ Sustainable Stadiums



اللجنة العليا
للمشاريع والتراث
Supreme Committee
for Delivery & Legacy



FIFA WORLD CUP
Qatar 2022





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Foreword by the Secretary General

Sustainability sits at the heart of preparations for Qatar 2022.

Qatar is committed to delivering the first carbon neutral FIFA World Cup™. That means all infrastructure projects – including the eight stadiums – must meet stringent sustainability benchmarks.

During their construction, we have recycled and reused wherever possible and implemented a vast range of energy and water efficiency solutions. In addition, we have used materials from sustainable sources and implemented innovative legacy plans to ensure our tournament doesn't leave any 'white elephants'. In order to achieve this particular goal, we canvassed local communities to find out what facilities they needed – and implemented their ideas and suggestions into stadium developments and precincts. The result is detailed legacy plans, including a proposal to remove the modular upper tier from several stadiums and donate the seats to countries in need of sporting infrastructure.

In addition, it is a source of pride for Qatar that we are constructing the first fully demountable stadium in FIFA World Cup™ history. Ras Abu Aboud Stadium will be made from modular shipping containers, which will be repurposed into a range of sporting facilities after the FIFA World Cup™. It illustrates the importance of sustainability and innovation to Qatar 2022.

Hosting the first FIFA World Cup™ in the Middle East and Arab world is an unmatched opportunity for our country and region. In line with Qatar's development goals, it is an opportunity to showcase an unwavering commitment to sustainability – and use the tournament as a springboard to inspire millions of others – not just in Qatar but across the region and around the world. We are proud of Qatar's many achievements to date and cannot wait to welcome the world to our state-of-the-art, sustainable stadiums in 2022.

Hassan Al Thawadi
Secretary General



The Stadiums

“Sports, and football in particular, has a unique capacity to inspire and spark the passion of millions of fans around the globe. Hosting the FIFA World Cup Qatar is a precious opportunity that we must not waste. We are proud to deliver a sustainable legacy for our country and the region.”

Eng. Bodour Al Meer, Sustainability & Environment Senior Manager, SC.



“Stadiums are key in our efforts to stage successful and more sustainable FIFA World Cups, which is why FIFA made sustainable certification mandatory in 2012. I am very glad to see how the FIFA World Cup 2022 hosts are achieving ambitious goals to create unique and sustainable stadiums for football and local communities.”

Federico Addiechi, FIFA Head of Sustainability & Diversity.

As breathtaking as the Qatar 2022 stadiums are, they're also environmentally responsible. From the methods and materials used in their construction, to their carefully considered post-tournament roles, our venues all focus on a sustainable future for Qatar, the region and the world. This was part of our bid commitment and forms an integral part of the FIFA World Cup Qatar 2022™ Sustainability Strategy.

Al Bayt Stadium

60,000

seats

Opening match and semi-final

venue

Inspired

by traditional tents

32,000

seat stadium after 2022

Over 70%

of external lighting is powered by

solar energy





Al Janoub Stadium

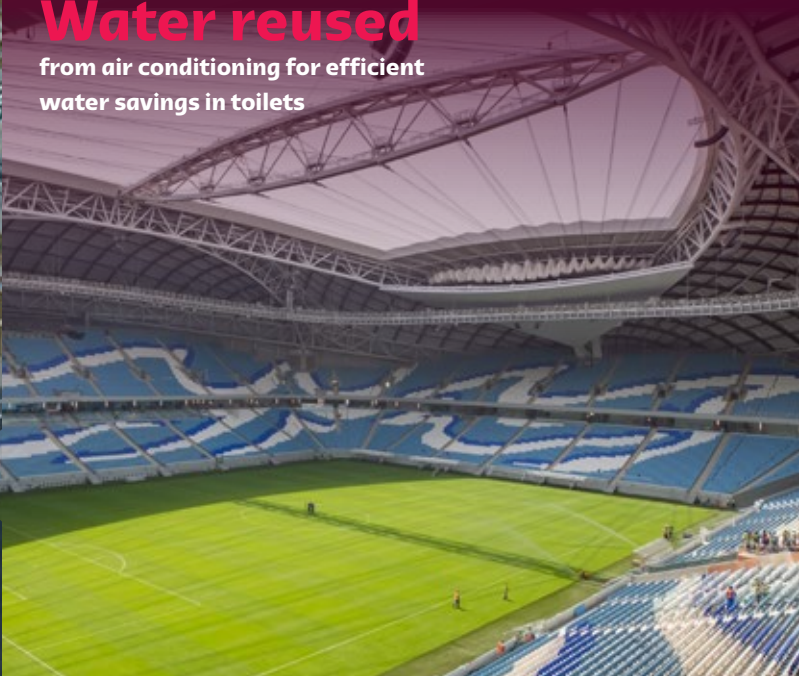
40,000
seats

Round of 16
venue

Design
based on dhow boats

20,000
seat stadium after 2022

Water reused
from air conditioning for efficient
water savings in toilets



Al Rayyan Stadium

40,000
seats

Round of 16
venue

Façade features
symbols
of Qatar

Al Rayyan
Sports Club
to inherit stadium

Over 90%
of previous stadium site
reused or recycled





Al Thumama Stadium

40,000
seats

Quarter-final

venue

Takes shape from regional
gahfiya cap

20,000
seats following Qatar 2022

More than 80%
of landscape is covered with native
vegetation



Education City Stadium

40,000
seats

Quarter-final
venue

20,000
seat stadium after 2022

Over 55%
of construction material
was procured
locally





Khalifa International Stadium

40,000
seats

Round of 16

venue

Original stadium built in
1976

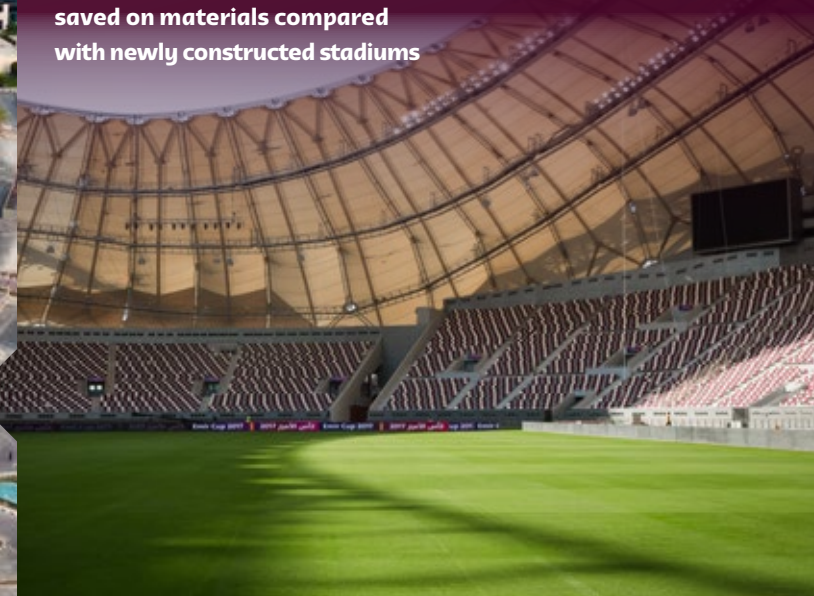
Part of the Aspire Zone

sporting hub

Keeping original

structure

saved on materials compared
with newly constructed stadiums



Lusail Stadium

80,000
seats

Final
venue

Inspired
by decorative bowls and lanterns

Stadium site will become a
community hub

Treated sewage
water
from on-site worker accommodation
reused
for dust control and toilet flushing
during construction





Ras Abu Aboud Stadium

40,000
seats

Round of 16
venue

Shipping container design
inspired
by nearby port

All parts to be
dismantled
and donated

Naturally ventilated
stadium structure lowers
energy usage

First fully
demountable
FIFA World Cup™ stadium



The Stadiums: Sustainability Facts

“Like a football match, there are highlights, but it is the full game and the end result that matters the most. To be able to stand back and see all the progress that we’ve made is really something we are all proud of. This has taken a significant amount of commitment, focus on integration, flexibility and team efforts.”

Orjan Lundberg, Sustainability & Environmental Expert, SC.



The Stadiums: Sustainability Facts

Green landscaping
creates a cooling
effect

More than **850,000m²**
of new green space, equivalent
to 121 full-sized football pitches

More than **16,000** trees

Water-efficient **plants**

Green spaces irrigated using
recycled water

Habitats for native
birds, lizards and other fauna

**40% less water
used than
international*
benchmarks**

Water vapour
collected from the cooling
system will be used for irrigation

Recycled water
used for dust suppression

Efficient fixtures
for sinks, showers and WCs


**30% more energy
efficient than
international*
benchmarks**

Passive energy efficiency features:
thick **insulation** and smart
site orientation

Active **energy efficiency** features:
efficient cooling and ventilation systems,
LED lighting and state-of-the-art buildings
control systems

* ASHRAE 90.1

* International Plumbing Code



**Modular design
means 170,000
stadium seats
can be donated**

Stadiums easily **dismantled**
thanks to modular design

Ease of disassembly facilitates
reuse and **relocation**

Ras Abu Aboud Stadium will be completely
disassembled

FIFA World Cup™ demands
massive seating capacity
compared to Qatar's local needs

Countries in need of sporting infrastructure will
receive **stadium seats** post-2022

**Stadiums will
be operational
year-round
post-2022**

Retractable **roofs** and cooling
technology for year-round use

Stadiums to be **reused**
by the community as hospitals, schools,
places of worship and hotels

Running, cycling and horse riding
tracks, and other
sporting facilities

Construction waste reused or recycled

90% of waste generated at Al Janoub and Al Rayyan stadiums reused or recycled

Stadiums designed for effective **waste management** during operation

Waste **segregation** and **recycling** on site

Wastewater recycled from on-site workers' accommodation for dust control and toilet flushing

All stadiums are pursuing sustainability certifications

Sustainability **certification** measures design, construction and operation stages

Energy centres are rated for efficient design and operation by the seasonal **energy** efficiency ratio (SEER)



**Public transport
brings fans
to stadiums**

Doha Metro is fast,
cost-effective and environmentally friendly

Trams and **buses**
connect car parks to stadiums

Extensive **network**
of pedestrian and bicycle pathways

Shaded pathways connect buildings
and car parks, helping to further
encourage **walking**

Bicycle racks
near building entrances
and pedestrian crossings

**Sustainably sourced
construction materials
are a priority**

15% of building supplies
from recycled materials

Using **local resources**
supports Qatar's economy
and investments

Indoor spaces finished with
non-toxic paint

Light-coloured exteriors
**minimise heat
retention** and urban
heat island effect

How Does Green Construction Fit in with the UN Sustainable Development Goals?

“Our sites can be larger than 100 football pitches, with thousands of workers, making daily challenges for housekeeping, waste, dust and noise levels, energy and water use – yet we have demonstrated sustainability best practices to mitigate any adverse environmental impact during the construction phase.”

Pradeep K. Chedalavada, Environmental Engineer,
Lusail Stadium, HBK Contracting.



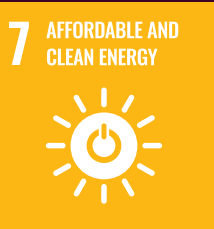
The United Nation's Sustainable Development Goals challenge us to reduce climate change, poverty and inequality, while also maintaining economic growth. Green construction and sustainable stadiums, in particular, are addressing some of the world's most pressing issues:



Goal 3 Good Health & Wellbeing

Ensure healthy lives and promote wellbeing for all at all ages
Sustainable Qatar 2022 stadiums feature improved lighting, better air quality and greenery, which are proven to positively influence occupants' health and wellbeing.





Goal 7 Affordable & Clean Energy

Ensure access to affordable, reliable, sustainable and modern energy for all

Energy efficient stadiums use up to 40% less energy than international (ASHRAE 90.1) benchmarks.



Goal 9 Industry, Innovation & Infrastructure

Build resilient infrastructure, promote sustainable industrialisation and foster innovation

Using cutting-edge technology and innovation – such as super-efficient cooling systems and light fixtures – means the Qatar 2022 stadiums are resilient and adaptable in the face of our changing global climate.





Goal 11 Sustainable Cities & Communities

Make cities inclusive, safe, resilient and sustainable

The Qatar 2022 stadiums are at the centre of some of the country's new sustainable community hubs, with over 1 million m² of new public space being created.



Goal 12 Responsible Consumption & Production

Ensure sustainable consumption and production patterns

Stadium construction uses recycled and locally sourced materials wherever possible. We minimise construction waste, as well as reusing and recycling up to 85% of waste materials. The stadiums are also designed for effective waste management during operation.





Goal 13 Climate Action

Take urgent action to combat climate change and its impacts

The Qatar 2022 stadiums' green designs are energy efficient. Furthermore, as part of the FIFA World Cup Qatar 2022™ carbon neutrality commitment, we acquire carbon credits to offset carbon emissions during construction.



Goal 15 Life on Land

Sustainably manage forests, combat desertification, halt and reverse land degradation, and halt biodiversity loss

The Qatar 2022 stadiums use recycled water for irrigation, dust control and toilets, reducing the demand for potable water by up to 40%. The landscaping features use local low-water-consumption plants and will provide new habitats for native birds and reptiles.



How do we measure sustainability?

“My most memorable moment was when Education City Stadium achieved a provisional 5-star certification from GSAS. The design began with lower sustainability levels but its performance was enhanced throughout the design development phase – and then it was awarded the first ever 5-star GSAS rating for design.”

Do Yoon Kim, Senior Sustainability Expert, ASTAD Project Management, Education City Stadium.

In 2012, FIFA's stadium requirements were amended to include an obligation for all FIFA World Cup™ stadiums to obtain an internationally acclaimed sustainability certification for construction.

For the FIFA World Cup Qatar 2022™ stadiums, the Gulf Organisation for Research and Development's (GORD) green building standard was selected because its Global Sustainability Assessment System (GSAS) certification has a unique feature. It is designed specifically for the MENA region and drives sustainability endeavours and climate actions by addressing global challenges in a regional context. GSAS assesses the design, construction and operational phases and offers three types of certifications:

The GSAS Design & Build Certification evaluates the sustainability of newly constructed or majorly renovated buildings in two stages:

- 1 Obtaining the provisional certificate following the design phase.
- 2 Conforming to the design audit during the construction phase; a total of five audits are conducted.

The GSAS Construction Management Certification assesses the environmental impact of the construction process. Four audits are conducted for sporting infrastructure projects.

The GSAS Operations Certification scores the sustainability performance of buildings in use. It audits the facility operations and tenant operating practices in order to assess energy, water, waste and indoor environment performance.

As the Host Country for the FIFA World Cup 2022™, one of our key values is upholding the principles of sustainability throughout the lifecycle – design, construction and operations – of the stadiums and other projects, targeting the following certifications as a minimum:

- 4-star GSAS Design & Build Certification
- Class A GSAS Construction Management Certification
- Gold GSAS Operations Certification

The GSAS certifications evaluate and assess:

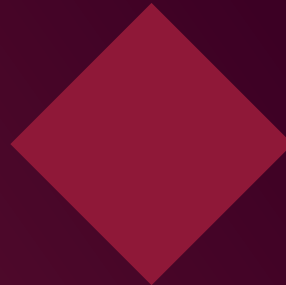
Urban connectivity

- Infrastructure around the stadiums
- How efficiently existing systems are being utilised
- Whether the need for new fixtures – like water, power and telecommunications – has been minimised
- Load on local traffic and parking facilities
- Accessibility measures



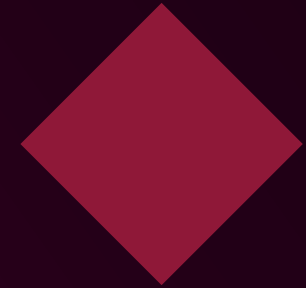
Energy

- How consumption and burden on municipal treatment systems is reduced
- Demand and delivery of energy in each part of the stadium
- The installation of renewable power sources
- Efficient lighting, air conditioning and ventilation systems
- Energy centres' role in the reduction process



Water

- How consumption and burden on municipal treatment systems is reduced
- Efficiency of systems that recycle and reuse water
- On-site water treatment facilities
- Efficiency of water fixtures on site
- Whether water consumption levels are continuously monitored



Construction materials

- What proportion of the materials are regionally and responsibly sourced
- Recyclability, reusability and ease of disassembly
- Proportion of reusable materials utilised to reduce waste
- Proportion of materials recovered on site that are reused or recycled to reduce the amount reaching landfill

Indoor environment

- Occupant comfort factors, such as levels of:
 - thermal comfort
 - acoustics
 - ventilation
 - natural light



The GSAS certifications evaluate and assess:

Outdoor environment

- Monitoring noise levels, dust, odours and light during all construction activities

Cultural and heritage value

- Expression of cultural heritage and identity within design
- How much the design contributes to the national economy by supporting local architects and construction companies



Management and operation

- Efficiency and maintenance of systems, including waste management, facility management and plans for systems checks and testing
- Waste management for recycling and reuse
- Storage of materials and mechanical equipment
- Health & safety on site throughout the construction process



Urban and socio-cultural considerations

- Traffic from on-site and off-site works during construction
- Impact on the on-site terrain
- How the load on municipal treatment facilities is reduced
- Preservation of any archaeological remains found on site
- Measures taken by site operators to minimise disruption to neighbouring buildings and surrounding community

Site

- Implementation of environmental planning to preserve and improve terrain, bodies of water and habitat
- How the terrain is preserved and enhanced pre and post-development
- How the terrain is preserved against solid and liquid waste
- Plans to reduce, remove and recycle solid waste
- How ecological integrity is preserved



Sustainable Construction

“We learned about the importance of specifying the sustainability requirements of construction materials to aid the procurement process. We also implemented a process for tracking the targeted material criteria.”

Suja Pramod Kumar, Design Manager (Sustainability and Architecture),
AECOM, Al Rayyan Stadium.

Traditionally, green building certification focuses on the design features, energy and water efficiency, and environmentally friendly materials. We take our green building practices a step further by obtaining an additional sustainability certification for our day-to-day construction work.

Our projects are large and last many years, so we implement best practices throughout construction, including **dust and noise control**, **waste management** and **energy and water conservation** on site. We have also partnered with GORD to deliver dedicated workshops for construction professionals working on our sites. These workshops are open to professionals working on other sites as well.

This commitment to going beyond legislated environmental requirements makes all the difference.

We are reducing our projects' environmental impact, finding innovative solutions and actively shari

and hopefully the region.

Every FIFA World Cup Qatar 2022™ stadium is on track to achieve GSAS certification, with Al Janoub, Education City and Khalifa International stadiums having already received these endorsements.



Sustainable Materials and Waste Management

“I was so impressed by the recycling efforts by local companies; there are too many to mention! Wooden pallets were recycled into mulch and green waste into compost. Used hydraulic oil, metal drums, paper and plastic were also recycled.”

Jaseela Muneer, Senior Environmental & Sustainability Specialist at Training Sites Programme, Nakheel Landscapes.

Host Country projects *recycle or reuse 70% of waste* on average, compared to 8% nationally. At Al Rayyan and Al Janoub stadiums, nearly 90% of the waste produced was reused and recycled.

On site

These figures were achieved through source segregation during construction. All stadiums are designed with effective waste management in mind, such as waste bins for source separation and ample space for separate waste streams.

Additionally, all construction sites have initiatives in place to reuse construction waste. For example, at Al Bayt Stadium, restaurants in the adjacent park were constructed using discarded construction materials.



Off site

We used local recycling companies to repurpose construction waste. As many of these companies are small, it took significant efforts to find and contract companies to provide recycling services.

Turning old into new

Building Al Rayyan Stadium required the deconstruction of the former Ahmed Bin Ali Stadium. The old stadium was carefully dismantled, its materials were sorted and segregated, and a new use was identified for its constituent parts. While some materials were sent for recycling, up to 90% were reused in the construction of the new stadium and precinct.

Sustainable supplies

When choosing the materials used for the stadiums, reused materials, locally produced materials and materials made with recycled content were prioritised.

Several suppliers that provide construction materials for the Qatar 2022 stadiums have conducted life cycle assessments to better understand the environmental impact of their materials and manufacturing processes.



“Sustainability is a team effort and everyone in the project team should work to achieve this together.”

Waleed Salaheldin, Head of Environment and Sustainability, Al Jabeer Tekfen JV, Al Thumama Stadium.

Energy Efficiency

The Qatar 2022 stadiums consume approximately **40% less energy** than standard designs – by minimising demand through efficient supply of energy to the building, thanks to the design of the building envelope. The term ‘building envelope’ describes a building’s floor, roof, walls and windows. Its design has a direct impact on the energy demand of the building. A thermally efficient building envelope minimises the demand on the building’s systems, optimising its energy efficiency.

Insulation

Green buildings are subject to a thorough analysis that ensures insulation is installed efficiently. All of our buildings have incredibly efficient insulation.

- Insulation minimises a building’s heat intake, lowering the demand on cooling systems
- Insulation prevents air escaping
- Ducts are insulated to maintain air temperature
- Insulation helps with indoor acoustics and other noise issues



“Cultural heritage elements do not compromise on key sustainability features. The material used to make Al Bayt Stadium’s ‘tent’ is compliant with the most widely used sustainability standard for production of PVC.”

Abhilash Rajan, Sustainability Manager Al Bayt Stadium, KEO.

Heat efficiency

The solar reflectance index (SRI) measures the amount of heat a material will emit when exposed to sunlight. The lower the SRI level, the hotter a material is likely to become in the sun. A low SRI will impact a building’s energy consumption as the demand on cooling technology will be higher.

This results in the “urban heat island effect”, which means that the solar reflectance levels of the human-made fixtures are lower than those of the green spaces around it.

Al Bayt Stadium’s façade

In the original plans, Al Bayt Stadium’s SRI levels were low due to its black façade. Therefore the façade was changed to a lighter colour, resulting in a much more energy-efficient building.

Al Bayt Stadium’s façade
(current and initial designs).



Retractable roofs

Retractable roofs can be closed in case of severe weather conditions – but that is not why the Qatar 2022 stadiums have them. The retractable roofs considerably improve the cooling process, meaning that the water and energy usage needed for the air conditioning systems will not be overburdened.

LED lighting

LED lights are up to **70% more efficient**, making them the best alternative to traditional lights. All the Qatar 2022 stadiums have LED lights and many other companies are making the switch. LED lights:

- are non-toxic
- distribute light efficiently, so less energy is required
- have a longer life span – up to six times longer – meaning lower carbon emissions produced in manufacturing, packaging and transporting and less maintenance

LED lights are particularly good for sporting events, featuring colour-changing lights and other showcase effects to enhance events, like the inauguration of Al Janoub Stadium.

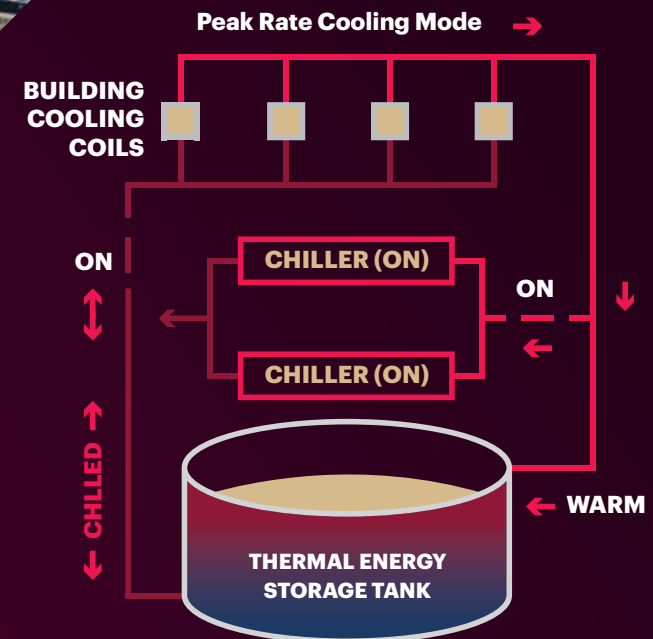
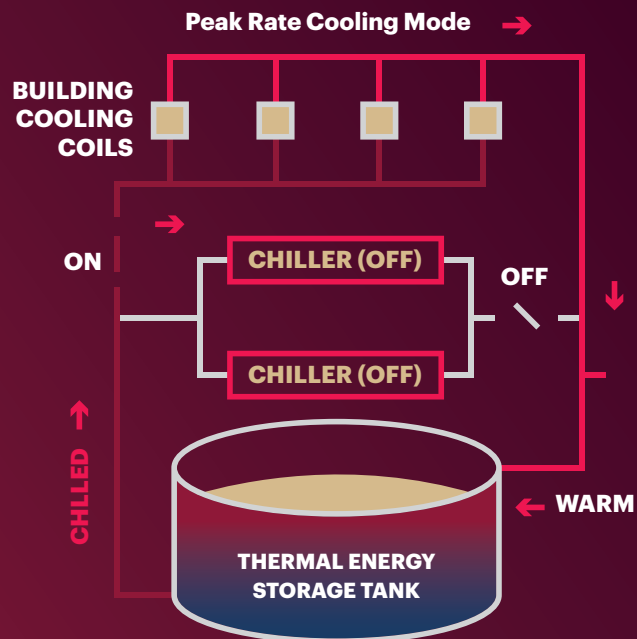


District cooling

Most of the Qatar 2022 stadiums have district cooling systems, rather than conventional individual systems for each building. The centralised location of this system results in a **50% decrease in energy consumption** and **lower greenhouse gas emissions**. The system's thermal energy storage allows the chillers to be operated during off-peak times, as shown in the diagrams.

This system is more efficient because:

- It uses water for cooling rather than refrigerants
- It requires less maintenance, making it more cost effective
- It can be utilised for different buildings, making it flexible
- It has backup systems, making it reliable
- The system is designed to service a full stadium, so in legacy mode, it can expand to service nearby areas



Water Efficiency

“Water is a very precious resource in Qatar so saving it is paramount, which is why I am very proud of the condensate water recovery for reuse in Al Janoub Stadium.”

Shashi Prakash, Sustainability & Carbon Expert for Programme-wide Sustainability Management, SC.

Qatar has a hot and dry climate with minimum rainfall – and even less groundwater availability. Qatar’s water needs are met with desalination of seawater, making water a precious and limited resource.

We take water management seriously throughout the construction and operation of all projects.

We have implemented water management initiatives for efficient usage and recycling:

- Efficient equipment and fixtures
- Water meters monitor consumption and leaks
- Efficient irrigation
- Recycling condensate water, rainwater and greywater
- Reusing water from construction dewatering activities
- Reusing treated sewage water



Al Janoub Stadium Efficient equipment and fixtures

Every stadium uses water efficient fixtures. Here are some examples from Al Janoub Stadium.

Waterless urinals

Urine flows down the bowl and then passes through a sealing liquid – usually a specially designed oil-based fluid – and collects in the waste pipe below. Odours are trapped below the oil layer and not in the bathroom – all without water!

Dual flush toilets

These toilets have two distinctive features that make them more efficient. The large trapway makes it easy for waste to exit the bowl using less water. The wash-down flushing design pushes waste down the drain.

In contrast, standard toilets employ a siphoning action, which brings a high volume of water into the bowl, filling the siphon tube and causing it to suck the water and waste out of the bowl and down the drain. In addition, users have the option of a half-flush or a full-flush – the water savings just add up.

Taps with automatic shutoff sensors

So much water is wasted because of leaks or people not turning off the tap. People tend to be unreliable, but automatic sensors are not, making them a top environmentally friendly solution.

These sensors are also accessible, making them particularly helpful fixtures for people with limited mobility. Hands-free taps are more hygienic, helping to reduce the risk of bacterial transmission.

Aerators on taps

This dilutes the stream of water, significantly reducing the volume of water flowing out.

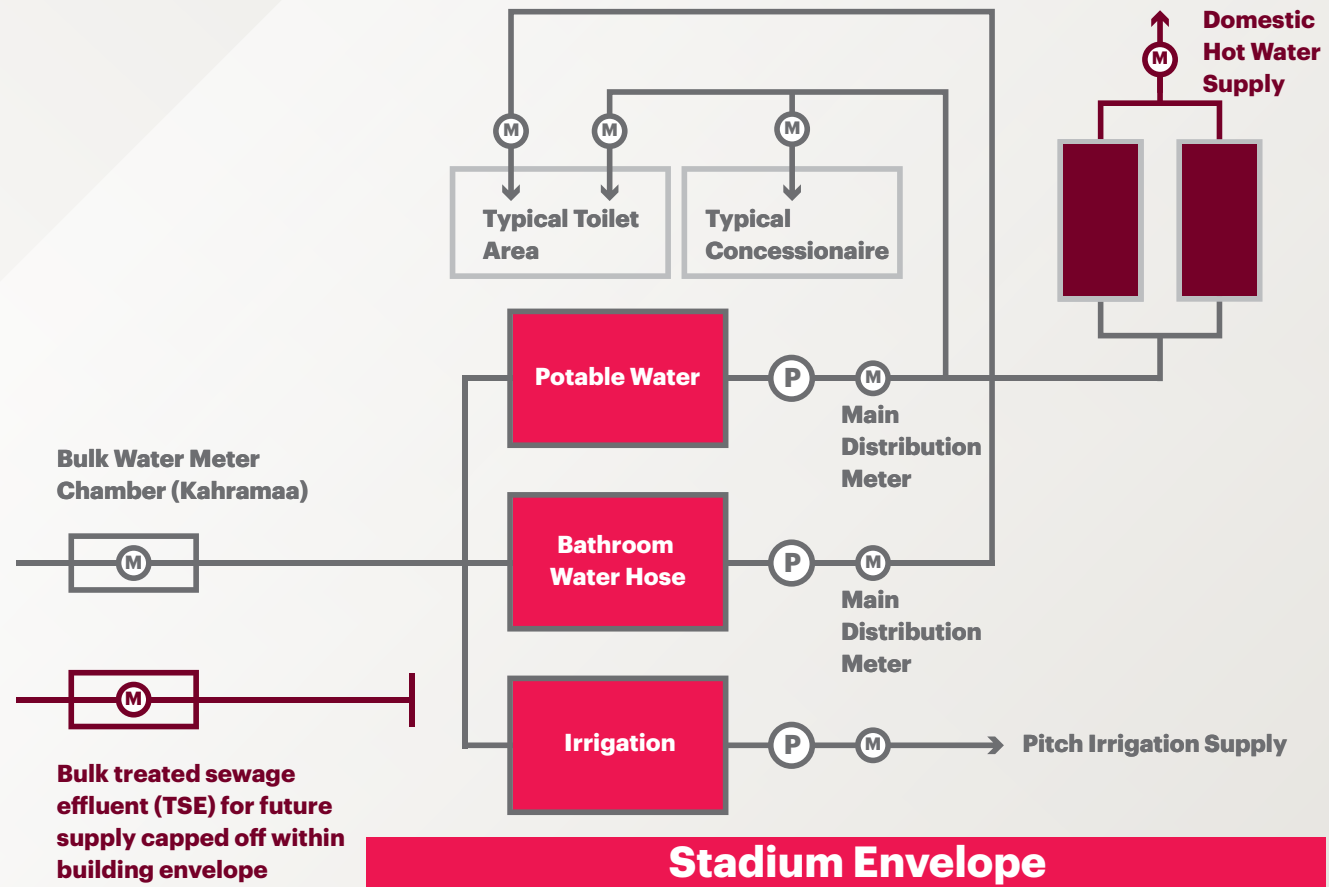


A tap with
an aerator.

Al Rayyan Stadium

How water meters reduce water waste and save energy

The building management system takes meter readings every half an hour. This data can be read remotely and exported to easily identify higher than normal flow rates, which means site workers can quickly solve leaks or other issues.



(P) pillar (M) meter

Training sites Efficient irrigation

The training sites need water to maintain the pitches.

The automatic irrigation system controls the valve and sprinklers according to the humidity and temperature, which **saves 20% more water** compared to manual irrigation control.

Al Bayt Stadium Water reuse and recycling

Condensate water

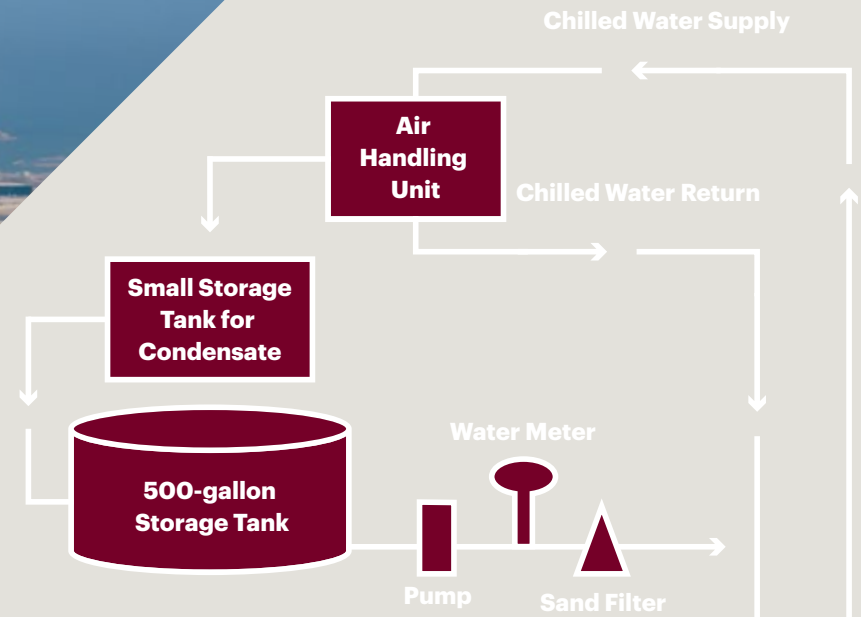
Condensate water from the cooling system is collected and then sent to the irrigation plant, where it is mixed with potable water for irrigation.

Rainwater

Rainwater from the roof is collected in a 28,000m³-capacity tank outside the stadium.

Treated sewage water

Sewage water is treated and reused for irrigation and dust suppression during construction. When the stadium is operational, the treated water will be used in the cooling tower and surrounding grounds.



Ras Abu Aboud Stadium Reusing contaminated water

The Ras Abu Aboud Stadium site's groundwater was contaminated due to past industrial operations, which required excavation and dewatering. This contaminated water then needed to be treated for reuse.

A treatment system including an artificial lagoon was constructed to allow storage and reuse. The water was tested daily for quality purposes before it was used for dust suppression.

12,500m³-capacity lagoon for water storage, lined with geotextile and high-density polyethylene.



Water treatment plant.



Water filling station.

Daily water quality testing.



Lusail Stadium Reusing treated sewage water

A temporary sewage treatment plant was installed for the Lusail Stadium workers' accommodation facility. The plant treats 1,000m³ of water a day, which is then used for dust suppression on site. This reduces the amount of fresh water needed on site and limits the need for water transportation.



Lusail Stadium sewage
treatment plant.

Transport

Travelling to FIFA World Cup™ matches in 2022 will be greener than ever before.

Every FIFA World Cup Qatar 2022™ stadium is connected to public transport – either via a close-by Doha Metro station or via shuttle buses – so the majority of fans and stadium staff will arrive at the venues using public transport.

The new state-of-the-art Doha Metro is fast, affordable and better for the environment compared to cars. The metro also connects to Hamad International Airport.

Lusail Stadium and **Education City Stadium** also have tram systems, providing efficient and safe access to the stadiums.

The stadiums are strategically located within or near neighbourhoods, which means that local residents can access them by foot or bike.

With this many options, there'll be less need for parking around the stadiums. During peak times, nearby parking facilities and park & ride options can be used.

“Education City Stadium’s most prominent sustainability feature is its public transport connectivity, including Doha Metro, park & ride, the tram system, cycling paths and well-located bike racks.”

Nayeem Yunus Alware, Environment/ Sustainability Manager, JPAC JV, Education City Stadium.



Green Space

“Working on Education City Stadium, I learned so many things that I would like to bring to future projects, such as material recovery, reusing construction waste and utilising nature for passive strategies rather than resisting it.”

Dennis Arpon, Environmental/ Sustainability Manager, JPAC JV, Education City Stadium.

Although a large amount of green space (**more than 850,000m²**) is being developed in Doha, a great deal of care has been taken to maintain sustainable water management in landscaping.

We have also been very careful to preserve pre-existing greenery on project sites. For example, at the Ras Abu Aboud Stadium site, over **875** trees were inspected and tagged, and as many as possible were dug up and moved to our plant nursery. These trees will later be carefully transported and planted at other precincts as needed.

Green space facts

- More than 16,000 trees planted
- Green spaces irrigated using recycled water
- Recycled water from cooling system used for pitch irrigation
- Efficient irrigation design: pressure-compensated bubblers and in-line drippers with automated irrigation control unit
- Low-water-consumption plants and trees used in landscaping
- 75% of selected plants are native species and drought tolerant
- Minimum use of water-intensive turf
- 84% of landscape is covered with native vegetation
- Plants selected that provide food and shelter for local birds, lizards and migratory birds
- Plants chosen to combat desertification



How Can Air-conditioned Stadiums Be Sustainable?

“It is a lot more sustainable to have a building that can be used all year round, rather than just in the winter. The stadiums will be an excellent legacy for our community.”

Abdulrahman Al Muftah, Sustainability Specialist, SC.

The modern football fan is expecting a first-class experience, which includes a comfortable environment while watching a match.

Cooling technology was installed because of the legacy goal to provide excellent facilities for the local community to use after 2022. This cooling technology means the stadiums can be used year-round, even during the summer, thus avoiding the venues becoming seasonally obsolete.

Reducing demand

The stadium only needs to be cooled a couple of hours before an event and until the event ends. Furthermore, only the fan and player areas need to be cooled, not the entire stadium bowl. Advanced controls means the cooling systems can be configured to cool only the areas that need it.

Cooled air comes through vents in the stands and through large nozzles on the pitch.

The stadium roof and bowl were designed using Computational Fluid Dynamics simulation to minimise hot outside air mixing with air inside. The stadium roof and walls are well insulated, also reducing energy demand. Therefore, cooling a stadium bowl comprises just 20% of a tournament venue's annual energy consumption.



Ras Abu Aboud Stadium: Modular Design

“Working on this project has been an incredible opportunity to combine my personal and professional life. I grew up in Doha and used to go to the beach club in Ras Abu Aboud. Now I’m part of the team creating the most innovative stadium at the same location, with its impressive modularity and legacy implications. It’s simply amazing.”

Dr Talar Sahsuvaroglu, Sustainability & Environmental Expert, SC.

Ras Abu Aboud Stadium is a first-of-its-kind, pioneering solution in sustainable design for sporting mega-events. Constructed using shipping containers as modular “building blocks”, this innovative 40,000-seat venue will be truly distinctive.

In legacy mode, the stadium will be dismantled and repurposed. By reusing the steel, seats, shipping containers and even the roof after the tournament, we can donate sporting infrastructure to communities in need and give life to this venue after 2022.

Ras Abu Aboud Stadium is located in Doha Bay, with waterfront access and views. Post-2022, this location will provide ample space for a waterfront development. And, as the infrastructure will have already been developed, it will leave an important legacy for the community.



Building this remarkable structure has produced a new construction standard and methodology. The prefabricated and modular elements will reduce the waste generated during production and construction. Consequently, it will have a shorter construction timeline than a conventional stadium of its size – not to mention the lower costs thanks to minimising the amount of construction materials.

Even the preparations for laying this stadium's groundwork involved a great deal of strategy. The groundwater, which was contaminated due to previous industrial activities, was drained and then treated before being used for dust suppression on site.

To counter the large amount of waste from deconstruction activities, an impressive **80%** of these materials were **reused or recycled**, including metals, electronics, wood and office and packaging waste. For example, almost 70,000 tonnes of concrete and asphalt were crushed, tested and stockpiled to use during stadium construction.

Some trees on site were 35 years old. We saved as many as possible, for use at other stadiums.

These conscientious improvements mean that the venue site will be easier to maintain and keep safe and clean.



Sustainability Knowledge Sharing Programme

“I have seen that human behaviour has the most impact on the environment, so I found the knowledge sharing programme great for raising awareness and providing practical recommendations.”

Gabriele Schiavo, Sustainability Engineer, Salini-Impregilo, Al Bayt Stadium.

Since 2017, we have conducted monthly stadium site visits, workshops and training courses to provide an open forum as part of our environment and sustainability knowledge sharing initiative. By providing unique practical learning, employees, consultants and contractors across all Host Country projects develop professionally and improve the state of sustainability in Qatar.

We have amassed a wealth of information and experience from professionals across the world.

The impact of this initiative is reflected in improved sustainability practices on site and progressively higher GSAS assessment scores. The knowledge sharing sessions encourage people to fulfil additional assessment criteria thanks to better understanding and discussions with fellow experts.

By sharing our knowledge, we are promoting the sustainable transformation of the local construction sector and supporting the [Qatar National Vision 2030](#).



Looking to the Future

With the design stage finished, construction in full swing and some stadiums completed, we are turning our attention to actually operating these state-of-the-art stadiums. Everyone working on these projects is excited to deliver a show-stopping (but still sustainable) FIFA World Cup™ in 2022.

This tournament's legacy is always at the forefront of our attention. So we want to transfer what we have learned to others embarking on similar journeys.

Once construction is completed, we will release another report with more details about the sustainability of the Qatar 2022 stadiums. In the meantime, feel free to contact us if you want to learn more about what we have been up to.

“The road to 2022 is leaving an extremely valuable sustainability legacy in Qatar’s construction industry.”

Martha Katafygiotou, Sustainability Assistant Manager, Lusail, Al Thumama and Ras Abu Aboud stadiums, TIME Qatar.

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