



# The Circular Economy in Qatar 1

Scoping Paper

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# About this report

This report is the first stage in a programme of work to develop data-driven policy recommendations that can support Qatar to diversify its economy and build a sustainable, circular economy for future generations.

It builds on the outcomes from workshops, interviews, and a survey to engage policymakers, professionals, academia and civil society within Qatar to capture their feedback. Details of this engagement can be found in Annex 3. This report is a high level scoping exercise which explores how moving to a circular economy can support Qatar to deliver on its QNV commitments through building a circular economy and securing continued clean growth, whilst preserving its cultural identity and values. The policy proposals set out in this report are based on the views of stakeholders during workshops and surveys. In the next phase the report will explore the impact and feasibility of these proposals in the Qatari context through extensive literature reviews, interviews, surveys, and assessments of similar international policies.

The report explores 6 sectors: hospitality, water, plastics, food, the built environment, and energy transition and renewables. In each of these sectors the report identifies:

- the challenges to improving circularity;
- the opportunities that circularity can bring; and
- the pathways that can be taken to realise these.

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# Foreword

# Executive Summary



It's about touching the earth lightly"

GLENN MURCUTT, ARCHITECT

A circular economy is a system-level framework that optimises the use of materials and products by circulating them within the economy. Through this, it eliminates waste (material and products that drop out of the cycle of economic utility), reduces environmental impacts and regenerates nature. The consequence of this approach is that it minimises or even eliminates the extraction of resources from the earth, thus maintaining the functional integrity of the earth's biosphere and preserving those resources for future generations. It endeavours to "touch the earth lightly".

Qatar is vulnerable to both the transitional and physical impacts of climate change and is already experiencing the financial impacts of environmental degradation. In 2010 the cost to Qatar of environmental impacts was estimated by the World Bank to be QAR 9.9bn per year (2.2% of GDP in 2010). This figure is likely to rise as the climate crisis deepens.<sup>1</sup> Therefore, for Qatar, transforming to a circular economy is an economic imperative.

In 2008 Qatar published the National Vision 2030 (QNV). This Vision reflects the priorities and values of the Qatari people and established four pillars to set a framework for future growth and prosperity. These pillars are:



**Human development** of all people to sustain a prosperous society;



**Social development** of a just and caring society based on high moral standards, and capable of playing a significant role in the global partnership for development;



**Economic development** of a competitive and diversified economy capable of meeting the needs of, and securing a high standard of living for all its people for the present and for the future; and



**Environmental development.** Management of the environment such that there is harmony between economic growth, social development and environmental protection.

## QATAR'S PROGRESS

In a single generation, Qatar has transformed its economy and now has one of the highest GDP per capita in the world.<sup>2</sup> Now, the country faces new challenges in the face of growing global concerns about sustainability and the impact of anthropogenic greenhouse gas emissions on the climate, people, the economy, and ultimately the 'health' of the planet. By drawing on its economic and cultural strengths and building on its reputation as a reliable trade partner, Qatar is in an influential position to establish itself as a sustainability exemplar in the Middle East and North Africa (MENA) region and even globally.

Qatar's progress across the sustainability and circular economy fields to date is far-reaching. For example, it was an early adopter of international environmental agreements such as its ratification of the UN Framework Convention on Climate Change (UNFCCC), Qatar's National Development Strategy (NDS), stipulates that prosperity and sustainability must sit side by side.

Qatar has now arrived at a pivotal point in its history. Decisions and investments made now will secure progressive sustainable development and allow Qatar to move with confidence through geopolitical challenges.

## ECONOMIC DIVERSIFICATION

Qatar's economy is heavily reliant on the energy sector. This makes the country vulnerable to the transitional risks of climate change including "stranded assets" (infrastructure or resources which are no longer of use). As set out in the NDS 2018-2022, diversification of the economy is needed to generate income from sectors other than energy to ensure that the country is resilient to "fluctuations of the global economy".<sup>3</sup>

In the NDS, six sectors were identified as priority growth areas. These were: (i) manufacturing industries; (ii) financial services; (iii) professional and scientific activities; (iv) tourism; (v) logistic services; and (iv) information and communication.<sup>4</sup> Qatar has already expanded and developed new sectors through its free zones and other initiatives. Free zones provide an investor-friendly legal and regulatory environment and have played an important role in catalysing export-oriented diversification in Qatar. The health sector is another area where Qatar has expanded and thanks to significant public investment it is now considered to be one of the best in the world.

Throughout this report, opportunities have been highlighted where circularity can create new prospects to enhance Qatar's diversification objectives and benefit from growth in non-hydrocarbon industries.

## OPPORTUNITIES AND CHALLENGES

Qatar's wealth and aspirations place it in a unique position to demonstrate its resolve and capitalise on the growing global focus on sustainability and the environment. Moving toward a circular economy has the potential to significantly strengthen economic growth. In Europe, the Ellen MacArthur Foundation found that adopting a circular economy could boost Europe's resource productivity by 3% by 2030, generating cost savings of €600bn a year and bring in €1.2 trillion of other benefits.<sup>5</sup> These savings were particularly in areas such as mobility, food and the built environment, which are also key sectors of Qatar's domestic economy.

Feedback was received from over 130 stakeholders working across a diverse range of sectors including climate change and organisations' sustainability. Both the survey and workshops sought views on the opportunities that Qatar could realise from moving toward a circular economy and the challenges it faces in achieving them. Respondents to the survey were also asked which sectors had the most potential to achieve positive environmental and/or economic impact by moving toward a circular business model. Full details are set out in Annex 3.

The top opportunities and challenges identified across the sectors are summarised below:

- The need for more government intervention and oversight was a priority in all sectors, with 35% of respondents citing a lack of policy enforcement as one of the top three barriers to moving to a circular economy. Many respondents called for new regulations on sustainable standards with 40% of respondents identifying it as one of the top three priorities to support a move to a circular economy. Feedback suggested that a top-level commitment was needed from government to build momentum to move toward a sustainable business model with a need for strict enforcement with penalties for transgression.
- Sustainable innovation was a strong theme in all the sectors. Many sustainable technologies are not suited to hot, arid conditions, necessitating development of bespoke, adapted technologies. For example, solar panels have struggled to maintain efficiencies with the high temperatures and dust in environments like Qatar. A lack of suitable sustainable alternatives was raised as the number one barrier to moving to a circular economy by respondents, with 35% of respondents listing it in the top three. Innovation would ensure that sustainable alternatives were available and help reduce the price. During one consultation, a participant proposed the creation of a sovereign wealth fund focused on leveraging finance to stimulate and support sustainable innovation. This could further support the diversification of Qatar's economy through establishing it as a regional hub for sustainable industries. Qatar could establish itself as a global leader in innovation and support the development of abatement technologies that could extend the lifespan of Qatar's Liquefied Natural Gas (LNG) sector for example through Carbon Capture and Storage (CCS).
- In all sectors, respondents identified that public information or behaviour change campaigns could have the biggest impact to support a move toward a circular economy, with 41% picking it as a top three priority. Inadequate education on the impacts of behaviour on the environment was identified as the second largest barrier across the sectors with 35% identifying it as a top three barrier. Building awareness of how improved behaviours impact on the environment can be a quick win for moving to a more efficient, circular economy. Alongside this, there were calls for green or sustainable procurement, cited by 28% of respondents as a top three priority intervention.
- Collaboration was a common theme, particularly regarding the sharing of insights and education between institutions to break down institutional barriers that limit collaboration and sharing. Qatar has a world-class education system and hosts a number of notable universities. However, coordination gaps and the mismatch of agendas were identified between the needs of industry and the research focus of academia.

# Sectoral approaches

## HOSPITALITY

### BACKGROUND



As seen in Qatar’s aim to deliver the most sustainable World Cup to date, Qatar’s hospitality sector has significant potential for sustainable expansion, supporting objectives for economic diversification. The government and private sector aim to invest ~\$45bn into the tourism sector by 2030.<sup>6</sup> With growth of the sector comes the risk of a greater impact on the environment both in terms of emissions and the biodiversity of vulnerable habitats such as coral reefs and deserts.

### KEY CONSULTATION THEMES (BARRIERS AND PROPOSED SOLUTIONS)

- Key themes from the consultation included:**
- 37% identified a lack of suitable alternatives to products which were accessible or affordable.
  - A lack of policy enforcement was identified as a challenge and 39% suggested centralised guidance on sustainability to support hotels to understand which approaches they should adopt.
  - A lack of available and accessible data, particularly with regard to lessons learned from other hotels.
  - Respondents proposed public and staff information campaigns, 41% identified integrated sustainable procurement standards, and the introduction of incentives to reward staff and guests for sustainable activities such as recycling bottles.
  - 44% suggested hotel alliances to share information, build awareness and understand best practices.

### CONCLUSION

Due to tourism being identified as a priority for Qatar’s diversification strategy and the international growth in eco-tourism-expected to be worth \$334.4bn globally by 2027 - the sector offers significant circularity potential.<sup>7</sup> This can be achieved through a well-coordinated policy landscape that is developed in collaboration with the industry and matches the ambition of the National Tourism Sector Strategy 2030

## PLASTICS, INCLUDING FASHION AND PACKAGING

### BACKGROUND



Qatar has taken positive steps to reduce waste plastic through a mixture of government and private sector-driven approaches. The government has set targets to increase the proportion of recycled materials to 20% of total materials used in 2022<sup>14</sup> and introduced a ban on single-use plastic bags in November 2022.<sup>15</sup> Organisations such as Al Meera, a grocery retailer, have introduced initiatives to encourage the use of reusable bags<sup>16</sup> and the Pearl, an artificial island in Doha, has introduced innovative “sea bins” to collect plastic waste.<sup>17</sup> Plastic waste pollution could have a significant impact on Qatar through microplastics entering food systems and the impact on air quality and health from the incineration of waste.<sup>18</sup>

### KEY CONSULTATION THEMES (BARRIERS AND PROPOSED SOLUTIONS)

- Key themes from the consultation included:**
- Challenges around suitable alternatives to plastic (44% of respondents), inadequate education on the impacts (40% of respondents), and a lack of infrastructure for recycling and the need to rely on private companies (28% of respondents).
  - Societal pressures to avoid wearing the same clothes twice were cited as contributing to increased textile waste.
  - Proposed solutions centred around increasing consumer awareness, including through: enhanced transparency on the environmental impacts of goods (25% respondents); regulatory approaches such as bans on single-use plastic and/or an extended producer responsibility (EPR) scheme (69% respondents); and taxes or fines (32%).

### CONCLUSION

In line with the global momentum to address plastic pollution and the significant imports of plastic and textiles, Qatar has begun to take the necessary steps towards a more sustainable system. The next stage will need to involve investment in the necessary recycling infrastructure and the introduction of a regulatory framework which places an onus on producer responsibility.

## WATER

### BACKGROUND



The issue of water scarcity has been prevailing problem throughout Qatar’s history and will only be compounded by climate change. The government has made significant strides, with: the National Environment and Climate Change Strategy<sup>8</sup> establishing clear targets to reduce groundwater abstraction by 60% work by KAHRAMAA (the national electricity and water utility company) to upgrade services and reduce leaks<sup>10</sup>; and the establishment of Tarsheed (a public awareness campaign run by KAHRAMAA) to reduce the per capita consumption of water and lower carbon emissions.<sup>11</sup> However, desalination - the process by which the dissolved mineral salts in water are removed - has a significant impact on the environment. Brine and chemical residues from the desalination process have been discharged into the environment causing rising salinity in the Gulf which has damaged marine aquatic organisms and habitats.<sup>12</sup>

### KEY CONSULTATION THEMES (BARRIERS AND PROPOSED SOLUTIONS)

- Key themes from the consultation included:**
- The challenges related to low policy enforcement (41%), short termism (25%), a lack of awareness of the environmental impacts (37%), infrastructure investment, and paucity of sustainable alternatives to fossil fuel powered desalination.
  - The need for metering (currently not in place for either domestic sector or industry) to ensure that residents are aware of their water usage and so that more targeted interventions can be made to reduce wastage (20%).
  - Respondents proposed awareness campaigns and further interventions centred around behaviour change to encourage a reduction and re-use of water through incentives (20%), education (44%) and fines (31%).
  - Building on the success of Tarsheed with innovative approaches to water preservation. These included proposals such as capturing water from the air and from AC units.

### CONCLUSION

The first priority is the efficient use of water i.e., through reducing the use of potable water. This needs a shift in behaviour to achieve efficiency. Next to this, the treatment and reuse of wastewater has the most potential to reduce environmental impacts from the water sector. The cost of treating wastewater is less than half the cost of desalination.<sup>13</sup> There are also infrastructure costs; eg; co<sup>2</sup> emission reduction could be made through renewable-powered desalination plants, new innovative agricultural techniques and tighter regulations on water consumption across all sectors.

## FOOD AND DOMESTIC WASTE

### BACKGROUND



Approximately 60% of domestic waste in Qatar is comprised of food waste.<sup>19</sup> Driven by the scale of the domestic waste, the need to improve food security and the challenges of relying on food imports, the government has set a target to achieve 70% self-sufficiency in the production of fresh vegetables by 2023.<sup>20</sup>

### KEY CONSULTATION THEMES (BARRIERS AND PROPOSED SOLUTIONS)

- Key themes from the consultation included:**
- Dependence on imports and climatic conditions in Qatar mean food has a substantially lower shelf-life than in countries able to access fresh goods locally, leading to high levels of waste and a greater reliance on plastic packaging to retain freshness.
  - A perception that lack of education on the environmental impact of unsustainable waste disposal is leading to high levels of waste (42% respondents). Alongside this, respondents proposed staff training on sustainable best practices (28%).
  - Lack of infrastructure to accommodate waste (41% respondents).
  - Proposed interventions included: supporting the expansion of composting facilities; 55% of respondents called for campaigns to shift consumer behaviours such as programmes to redistribute excess food to poorer households; the introduction of new standards and regulations (41%); and expanding the utilisation of waste-to energy methane collection.
  - There was also a discussion on embedding national pride into sustainability initiatives.

### CONCLUSION

Qatar’s Food Security Strategy centralises agricultural self-sufficiency, offering a significant opportunity to both diversify the economy and position Qatar as an innovation hub for sustainable food production. Embedding sustainability into this policy and developing an efficient waste recycling infrastructure will enhance agricultural sustainability, help to create sustainable food production systems, reduce export demand and food waste.

THE BUILT ENVIRONMENT

BACKGROUND



The built environment, and within that the design and construction industry, is an integral part of the economy. Strides have been made towards sustainability and circularity through the application of voluntary building sustainability assessment systems. These include the Leadership in Energy and Environmental Design (LEED) and the Global Sustainability Assessment System (GSAS), which is a built environment sustainability rating system developed by the Gulf Organisation for Research and Development (GORD) in Qatar. Largescale urban developments such as Lusail City and Msheireb Downtown, as well as the World Cup stadia and associated buildings have deployed these systems.

Operational use accounts for a significant proportion of the life cycle carbon emissions in this sector. Other environmental impacts related to the built environment range from air pollution (like ozone depletion and acidification) to waste production. These become evident when a life cycle assessment approach is adopted that extends from cradle (when all construction are materials and products are made from raw materials) to delivery on site, their functional lifetime within the built environment and then to grave (when all the materials and products are returned safely to the Earth).<sup>21</sup>

KEY CONSULTATION THEMES (BARRIERS AND PROPOSED SOLUTIONS)

- Key themes from the consultation included:**
- Challenges to improving sustainability due to a ‘siloe d approach to policy interventions’ (30% respondents), a lack of strong regulation (40% respondents) and a lack of incentives to use domestic recycled materials.
  - Respondents noted that construction methods and materials used were often low quality and there was lack of available data on their environmental impacts.
  - Proposed interventions also included the development of coordinated national planning approaches and standards (59% respondents); innovation for green construction materials (17% respondents); tax incentives for sustainable retrofitting (24% respondents) and changes to procurement practices (54% respondents) including post occupancy evaluation and strict policy enforcement.

CONCLUSION

In recent years construction in Qatar has increased exponentially, accompanied by a range of policy interventions to promote sustainable development. Qatar now needs to build on this track record and the momentum from the World Cup 2022. Policy interventions should take both a holistic approach to address the built environment’s whole life cycle (including recycling and use of certification schemes) as well as a more targeted approaches for different project types and building archetypes.

ENERGY TRANSITION AND RENEWABLES

BACKGROUND



The energy sector has considerable environmental impacts, from emissions to air pollution and the release of harmful chemicals. Energy transition is therefore a global priority, with a number of multinational initiatives launched in the last year to mobilise billions towards the just transition, particularly in emerging economies.<sup>22</sup> Qatar is in a strong position to capitalise on this and its reputation as a reliable trade partner to harness private sector investment. Qatar has made significant progress in scaling up renewables, in particular solar, with the launch of a new solar plant, which is set to provide up to 10% of Qatar’s peak electricity demand.<sup>23</sup>

KEY CONSULTATION THEMES (BARRIERS AND PROPOSED SOLUTIONS)

- Key themes from the consultation included:**
- Absence of a long-term target for decarbonisation and a post-2030 plan from Qatar Energy (29% respondents) with respondents calling for a long-term transition strategy as a priority to ensure continued investment in the sector.
  - A lack of adequate infrastructure and accessibility of sustainable alternatives, as well as research collaboration gaps between academic institutions and industry (32% respondents).
  - Another proposal from 39% of respondents was for Qatar to position itself as a sustainable energy innovator whilst prolonging the life of the hydrocarbon sector in a net-zero world.
  - New carbon markets or pricing systems were also identified by 38% of respondents as a priority for the sector, as was the introduction of regulations on sustainable standards (30% of respondents).
  - Subsidies for green companies were proposed by 26% of respondents.

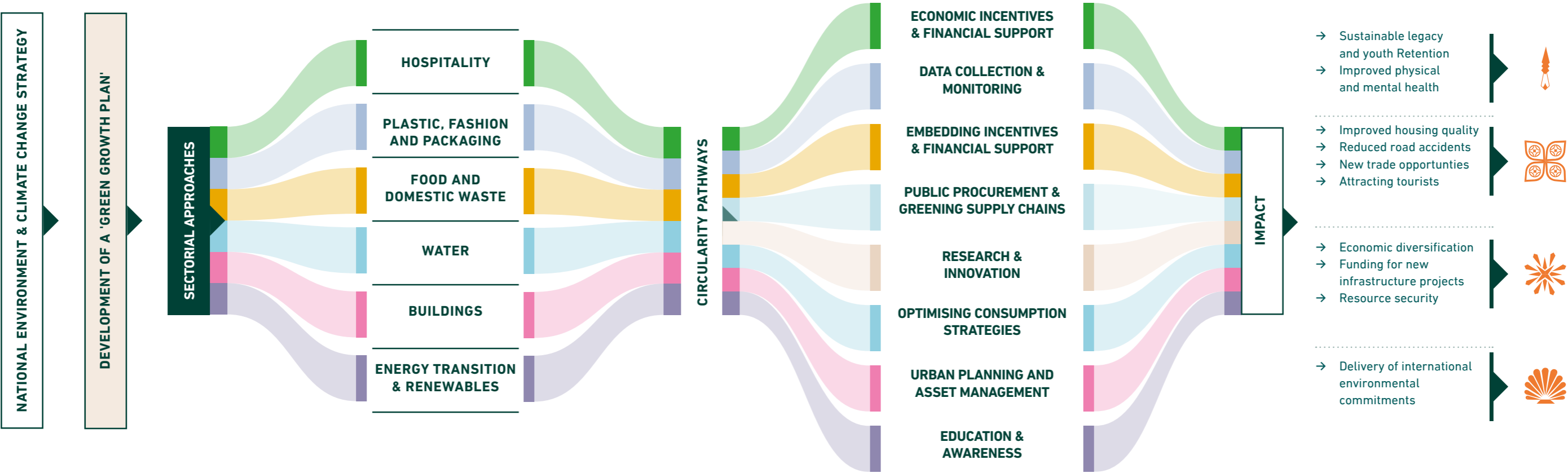
CONCLUSION

Acting on the need to diversify and innovate in the energy sector, whilst pivoting away from a reliance on hydrocarbon exports, is essential to ensure Qatar’s sustainable development. Continued investment in renewables will be an important part of this strategy.

NEXT STEPS

During the next stage of work an Issues Paper will be developed. The paper will focus on the built environment, hospitality, and food and domestic waste sectors. It will seek to understand the economic and environmental impact from the pathways proposed in the initial consultations and provide targeted policy recommendations to realise the circularity pathways and overcome the challenges identified. The policy recommendations will be rigorously tested against data and analysis from Qatar or international benchmarks to determine the interventions' effectiveness for addressing environmental and climate issues and the impact on Qatar's economy.

CIRCULAR PATHWAYS TO THE QATAR NATIONAL VISION 2030



# Introduction



## It's a matter of legacy and existence

As an arid, low-lying country, Qatar faces particularly acute challenges from climate change. The country has seen faster than average temperature increases, with temperatures having already increased by 2oC since the industrial revolution (double the global average of ~1oC). As this trend continues there will be a knock-on impact on productivity and efficiency in Qatar, with rising temperatures making outside labour impossible and increasing the consumption of water and energy.

Global temperature increases will also lead to rising sea levels. Global sea levels are projected to rise by two metres by the end of the century. This will have significant impact on Qatar whose major city centres, such as West Bay and Corniche are located on its shoreline. As well as facing the impacts of climate change, Qatar has a unique and fragile ecosystem. In 2010 the cost of all current and future impacts of environmental damage was estimated to be QAR 9.9bn a year (2.2% of GDP in 2010). Most of these costs stem from air pollution (55.5%), missed opportunities to use treated sewage effluent (TSE) (15.5%), groundwater depletion (9.5%) and degradation of coral reefs (8%).

Qatar's National Vision 2030 (QNV) sets out Qatar's ambition to transform the economy so that it can sustain its own development and provide a high standard of living for all its people for generations to come. It captures the enormous progress that Qatar has made and the challenges that come with an accelerated pace of development such as national identity and overstrained resources.

In 2012 Qatar affirmed its commitment to sustainable development at the UN Conference on Sustainable Development and to achieving an economically, socially, and environmentally sustainable future. The QNV highlights that a sustainable approach is needed to ensure that future generations continue to benefit from the same opportunities. In delivery of the QNV, the National Development Strategies (NDS) commit to align with the Sustainable Development Goals, linking national growth and prosperity to environmental conservation.

## OUR APPROACH

This report is the first stage in a programme of work to develop data-driven policy recommendations that can support Qatar to diversify and build a sustainable, circular economy for future generations. It builds on the outcomes from workshops, interviews, and a survey to engage policymakers, professionals, academia and civil society within Qatar and capture their feedback. Alongside feedback from the consultations this report draws on international examples and available data from Qatar. The consultations focused on six sectors: (i) hospitality; (ii) water; (iii) energy transition and renewables; (iv) plastics, including fashion and packaging; (v) the built environment; and (vi) food and domestic waste.

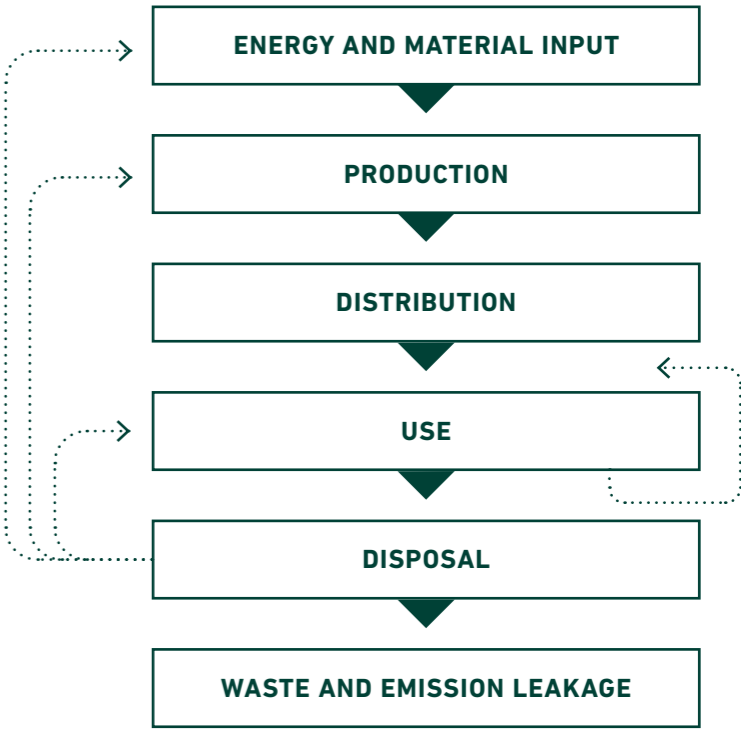
The consultations sought views on the opportunities that Qatar could realise from moving toward a circular economy and the challenges it faces in achieving them. The report explores potential pathways to a circular economy for each sector, based on feedback from consultations and international approaches. Respondents were also asked which sectors had the most potential to achieve positive environmental and/or economic impact by moving toward a circular business model. Full details are set out in Annex 3.

## WHAT IS THE CIRCULAR ECONOMY?

A circular economy is a system-level framework that optimises the use of materials and products by circulating these within the economy. Through this, it eliminates waste (material and products that drop out of the cycle of economic utility) and reduces environmental impacts and regenerating nature. It is not just about eliminating waste but goes to the heart of sustainable anthropogenic resource use. It is established on three principles:



- 1 Eliminate waste and pollution;
- 2 Circulate products and materials (at their highest value); and
- 3 Regenerate nature.

In a linear economic model, natural resources are made into products that are finite and eventually become waste as a result of their design and manufacturing. In contrast, the circular economy is underpinned by a transition to renewable energy and material; it seeks to divert economic activity away from the consumption of finite resources. The circular economy is a resilient, sustainable system which benefits people, the economy, and the environment.



# Opportunities from a circular economy

Moving toward a circular economy can help to realise a number of opportunities for Qatar and support the delivery of the QNV.

QNV PILLARS	QND S2 PRIORITY PROJECTS	CIRCULAR ECONOMY OPPORTUNITIES
HUMAN DEVELOPMENT 	EDUCATION & TRAINING	Moving toward a more circular economy can support a range of human development indicators. It can improve the harmonisation between education and the labour market through creation of new industries and training programmes. In turn, this can help to retain skilled workers in Qatar after they graduate from university. There could be an opportunity for collaboration between the Education Ministry and Qatar Foundation to develop this. Increasingly, the younger generation's values are focused on their impact on the environment around them. Increased circularity can build pride in Qatari values through a shift toward more sustainable approaches. Deloitte's global Gen Z and Millennial survey found that climate change was the second biggest concern for these generations (25%), with 37% having left a job that did not align with their values. <sup>24</sup>
	HEALTHCARE	Approximately 70% of the population is overweight and 44% have low physical activity. <sup>25</sup> Circularity can improve the health of a population and lead to a decrease in obesity rates through the encouragement of walking rather than driving. In addition, enhanced health protection can be achieved through minimising harmful chemicals in the environment and improved water and air quality. For example, as a result of China's wide-ranging Air Pollution Action Plan, a sharp reduction in particulate matter led to a 23% reduction in respiratory mortality between 2013 and 2017. <sup>26</sup>
SOCIAL DEVELOPMENT 	SOCIAL PROTECTION, FAMILY COHESION AND WOMEN'S EMPOWERMENT	Moving to more sustainable buildings can improve the quality of living and efficiency of housing and resources. Shifting behaviours away from unsustainable practices towards a reduction in consumerism can also improve family budgets.
	SECURITY AND PUBLIC SAFETY	Reduced road accidents through improved provisions for pedestrians. In the United States, a higher number of bike lanes caused a significant reduction in fatalities, including a drop of 60% in Seattle. <sup>28</sup>
	SPORTS AND CULTURE	Aligning the growth of the hospitality sector with growing global eco-tourism trends can offer an attractive and bespoke experience for an increasingly environmentally conscious market. For example, the establishment of Jordan's largest nature reserve, the Dana Biosphere, has attracted a significant proportion of 150,000 ecotourists who have helped to support local employment and vulnerable households, and over 160,000 families within rural communities across the country. <sup>29</sup>
	INTERNATIONAL COOPERATION	Improving Qatar's sustainability credentials can support the building of political capital both in the region and internationally through an increased profile in the three Rio Convention discussions (biodiversity, climate change, desertification). This can be a useful tool in other international fora, such as trade. Increasing alignment with international sustainable finance standards, and other environmental standards, can also facilitate increased commerce. Earlier this year Japan launched the GX league, a carbon pricing system, with the aim of facilitating trade with the EU following the introduction of the EU's carbon border tax. <sup>30</sup>

QNV PILLARS	QND S2 PRIORITY PROJECTS	CIRCULAR ECONOMY OPPORTUNITIES
ECONOMIC DEVELOPMENT 	ECONOMIC DIVERSIFICATION AND THE PRIVATE SECTOR DEVELOPMENT	Trillions of dollars need to be mobilised globally in order to adapt to the impacts of climate change, transition to a low carbon economy and stop biodiversity loss. <sup>31</sup> This cannot be met by the public sector alone. Countries are looking to catalyse investment from the private sector through public-private partnerships and innovation. Qatar can position itself at the heart of the sustainable transition through investment into sustainable innovation, research and development of new abatement solutions. At COP27 Egypt launched the country's Nexus of Water, Food and Energy (NWFE) programme to capitalise on international transition finance and mobilise finance for a transition to a low carbon economy.
	ECONOMIC INFRASTRUCTURE	Qatar can mobilise increased funding for infrastructure projects through polluter-pays approaches to policy. This can support a move to a more integrated, sustainable management of water and energy resources. For example, the EU's extended producer responsibility schemes places the responsibility on producers to put in place infrastructure for the re-use and recovery of used packaging. <sup>32</sup> Resource efficiency and security of supply for critical raw materials can be improved through recovery and re-use. Additionally, improving energy efficiency can enable Qatar to increase the gas available to export. In addition, this ethos can extend to buildings through wide scale extension retrofitting.
	NATURAL RESOURCES MANAGEMENT	Improved circularity can support industry through increased resource security for critical raw materials and support the development of abatement technologies to reduce the risk of stranded assets. Creation of a holistic urban circular ecosystem can enhance food, water and energy efficiency and expand agricultural outputs. Diversification of the energy mix to include renewables can increase profits from the natural resources sector. For example, in Bahrain, widespread usage of hydroponic farming produces over 5,000 tonnes of fresh food annually, whilst using 80% less water than traditional methods. <sup>33</sup> There is also significant potential for Treated Sewage Effluent (TSE) to better manage water resources.
ENVIRONMENTAL DEVELOPMENT 	ENVIRONMENTAL SUSTAINABILITY	Moving toward a circular economy supports the delivery of environmental development objectives including Qatar's NDC and NDS and the commitment to preserve the desert and marine biodiversity. Development of permaculture, aquaponics, vertical farming and other innovative agricultural practices to build a sustainable agricultural system which also support a diverse economy. Through preserving and replanting mangroves, Egypt is enhancing biodiversity, protecting coastal erosion and combatting climate change, with the trees absorbing five times more carbon than conventional forests. <sup>34</sup>

# Chapter 1

## Qatar context, toward a circular economy.

## Qatar's Progress



The Qatar National Vision 2030  
is a Roadmap for our future”

**DR., H.E., AND MINISTER OF ENVIRONMENT  
AND CLIMATE CHANGE**

Qatar has made significant advancements to become the world's leading exporter of liquefied natural gas (LNG). The country has undergone a remarkable transformation by directing investment into world-class infrastructure, new cities and urban centres.

Qatar was an early adopter of the UN Framework Convention on Climate Change in 1996 and in 2008 published the Qatar National Vision 2030 (QNV). The QNV aimed to deliver continued economic growth and prosperity for Qatar whilst balancing innovation with the preservation of traditions and enshrining strong Islamic and family values. The QNV was built on four pillars: Human Development, Social Development, Economic Development and Environmental Development. The environmental development pillar recognised that there needs to be harmony between the environment and the other pillars of the QNV. In 2021 Qatar announced a Nationally Determined Contribution (NDC) which commits to a 25% reduction in emissions by 2030 compared to a business-as-usual baseline. Alongside the NDC, the government has made several international commitments including supporting the UN Convention on Biological Diversity's target to

protect at least 30% of the planet by 2030 and becoming a signatory of the 2021 Global Methane Pledge.

Through economic expansion, emissions have risen across all sectors. However, since the early 1990's Qatar has significantly reduced the energy intensity of its primary energy consumption per unit of GDP. Since the 90's energy and gas thermal efficiency in energy production has improved, a mandatory Green Building Code was developed, and a renewable energy committee was established. In 2012 KAHRAMAA launched a National Energy Management and Efficiency Programme (Tarsheed) to reduce domestic electricity and water consumption and to lower carbon emissions. Within four years, Tarsheed enabled a reduction in per capita electricity consumption of 18% and a reduction of water consumption by 20%. In 2021 the Ministry of Environment and Climate Change set a target to reduce ground water extraction by 60%.

Most recently Qatar strived to make the World Cup the most sustainable yet; a hugely ambitious and innovative goal. This was achieved through measures to increase the sustainability of hotels, construction of infrastructure, introduction of new green spaces and electrifying transport.

**FIGURE 2**  
QATAR ENERGY INTENSITY AS PRIMARY ENERGY CONSUMPTION PER UNIT OF GDP.

Source: Our World in Data based on BP; World Bank; and Maddison Project Database

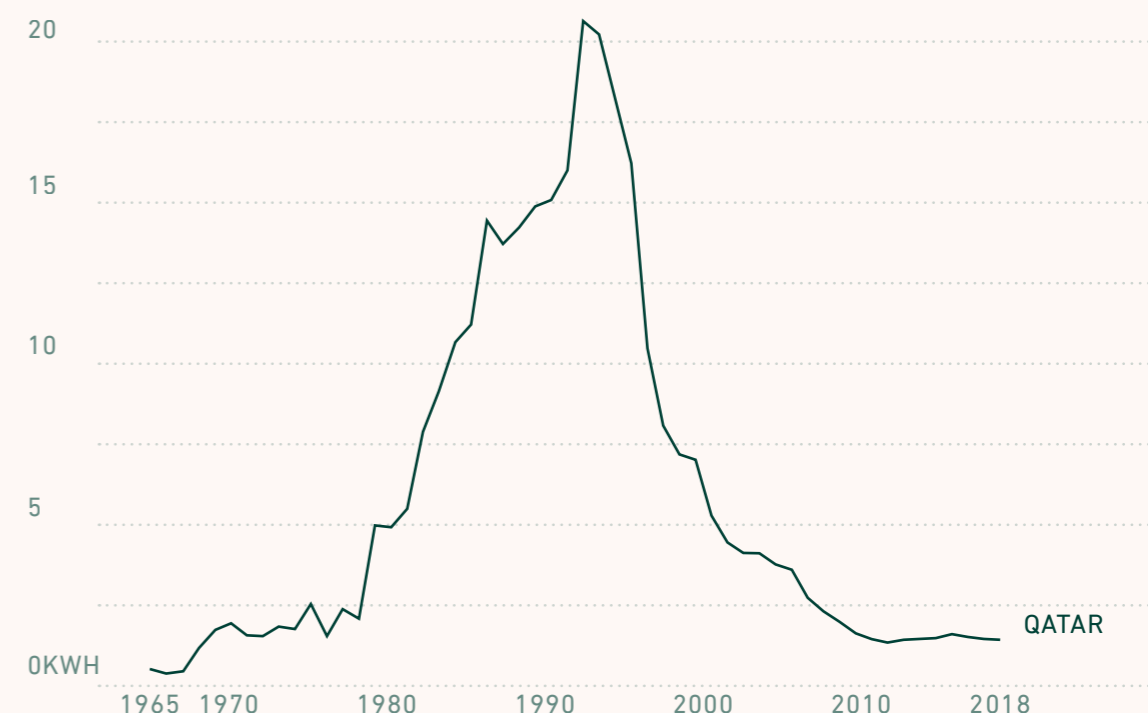
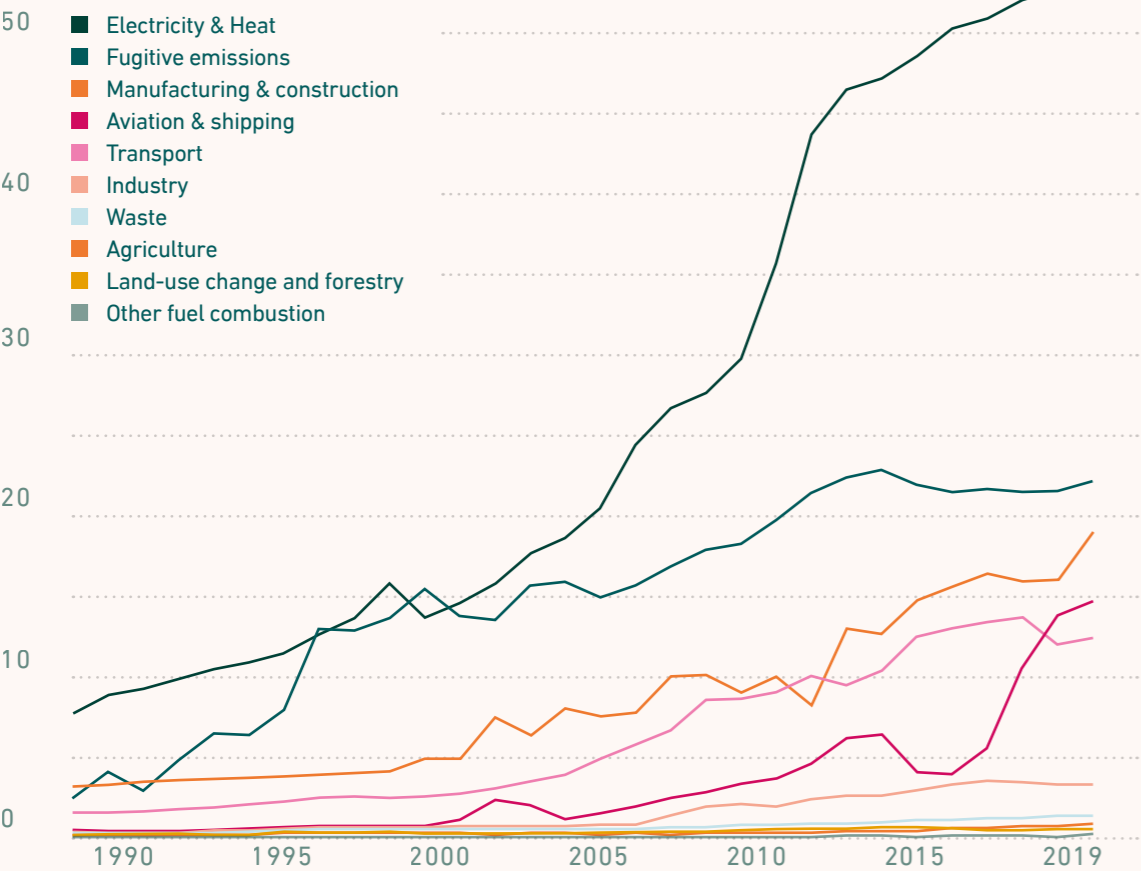
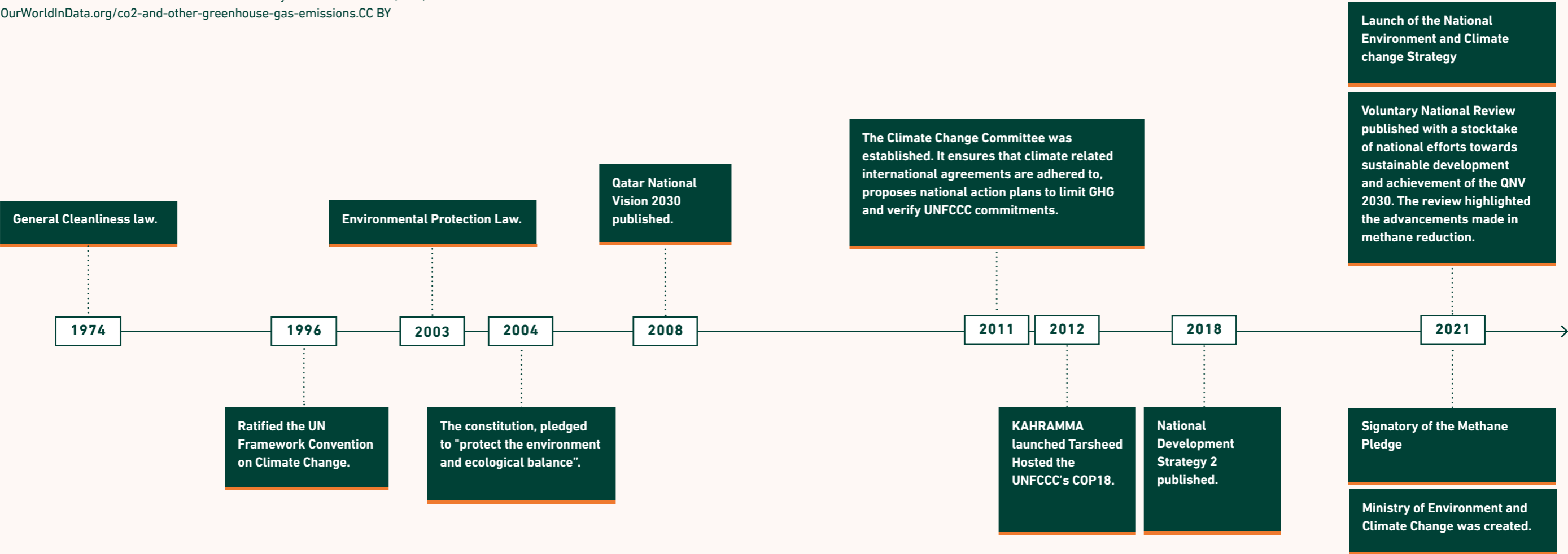


FIGURE 3: QATAR GREENHOUSE GAS EMISSIONS BY SECTOR (CO<sup>2</sup>E)



SOURCE: Our World in Data based on Climate Analysis Indicators Tool (CAIT).  
OurWorldInData.org/co2-and-other-greenhouse-gas-emissions.CC BY

The Qatar Stock Exchange (QSE) has taken on a leadership role through digitalising voluntary ESG (Environmental, Social and Governance) reporting through the development of a sustainability dashboard. 15 of the 47 QSE-listed companies are currently using the dashboard. In 2017, the QSE also introduced ESG guidance to assist all listed companies wishing to incorporate ESG reporting into their existing reporting processes. The QSE is working on the adoption of mandatory ESG reporting for QSE-listed companies, which may take effect within the next year.



# Circular economy pathway

Through the consultations, and building on international examples, a number of pathways were identified to support Qatar’s transition to a circular economy and the delivery of the QNV (see annex 2). These are outlined below and include examples of some of the cross-cutting interventions proposed during consultations.

CIRCULAR ECONOMY PATHWAYS	DETAILS	QNV PILLAR SUPPORTED
STRATEGIC COMMITMENT	Qatar has a clear overall vision for its future trajectory economically, socially, and environmentally. Examples include including the National Tourism Strategy, Food Security Strategy and the National Environment and Climate Change Strategy. In order to enable the efficacy of this vision within the environmental sphere, Qatar would benefit from a comprehensive “Green Growth Plan” which outlines detailed implementation pathways and key performance indicators to support decarbonisation and biodiversity. It would set out how the government will deliver on the targets outlined in strategies such as the QNV, NDS and the National Environment and Climate Strategy. This plan would consolidate ambitions and set a transparent, evidence-based pathway to achieving positive outcomes for nature in line with the growing global momentum in this area. The consultations also highlighted the need for top-down direction on sustainability and long-term (post-2030) plans. A review of the progress made by existing strategies would also increase public awareness of the positive steps already taken and highlight areas for prioritisation going forward.	
ECONOMIC INCENTIVES & FINANCE SUPPORT	Particularly in consumer-focused sectors such as Fashion and Domestic Waste and Food, incentives were seen as a useful approach for shifting behaviours. Financial incentives and subsidies for circular economy practices offer a proven method for expediting the uptake of circular economy practices. There are numerous examples of successful incentivisation and subsidy schemes for renewable energy and technologies across the domestic and business environment. There are key opportunities in Qatar in relation to sustainable energy generation (solar in particular), water and agriculture. Carbon pricing is a growing area of importance internationally, the pace of implementation having been accelerated by the operationalisation of carbon markets under the Paris Agreement and the growth of international compliance markets, driven by the development of the EU’s carbon border adjustment mechanism (CBAM). For example, the UAE has recently launched a carbon credit trading exchange with the aim of attracting inflows from global capital markets as investors increasingly seek ESG-compliant investment opportunities. The introduction of a Qatari carbon pricing system would support the development of a circular economy, create new revenue streams and support Qatar to enter new markets.	
DATA COLLECTION AND MONITORING	Throughout consultations the availability of data was seen as a barrier to a transition to a circular economy. A centralised, standardised, transparent approach to data collection and dissemination was raised as a priority and would allow Qatar to take a more knowledge based, data driven approach to policy development, as well as to showcase progress. Data collection could include the use of water and electricity meters, tourism insights and studies into the uptake and effectiveness of strategies and technologies. Additionally, submitting a UNFCCC emissions inventory would be helpful not just for supplying information to showcase Qatar’s progress towards addressing climate change, as the national reports are an effective resource to feed into the development of national planning and environmental strategies. A common thread through the consultations was the importance of education and knowledge sharing between institutions. Qatar has a world-class education system and hosts a number of notable universities, with the country’s education and training sector at the core of its human development goals. However, gaps were identified in the coordination between industry needs and the focus of university research, both in terms of coordination and communication. Knowledge exchange platforms were proposed to enable material exchange and to create and support opportunities for industrial symbiosis.	

## EMBEDDING CIRCULAR PRACTICES

To be most effective, circular economy strategies need to be understood and adopted across the whole of society. In the Plastics and Packaging, Domestic Waste and Food, Energy, Built Environment and Water sectors introducing new regulation on sustainable standards was in the top 3 most impactful changes that could be made in Qatar. Adoption of globally recognised regulatory standards within and across sectors will strengthen Qatar’s credibility and commitment to high standards. This benchmarking will translate internationally and facilitate international relationships and investment. Examples include international sustainable finance standards and mandatory ESG reporting which can help to demonstrate commitment by Qatar and enhance the country’s reputation internationally. In relation to ESG, efforts from the QSE could be coupled with direct intervention from the Qatari government and sector specific bodies, which could introduce similar voluntary and ESG reporting for non-listed companies. The International Sustainability Standards Board (ISSB, a new standard-setting board which came out of COP26) has the intention of delivering a comprehensive global baseline for sustainability-related disclosure standards. These provide investors and other capital-market participants with information about companies’ sustainability-related risks and opportunities. Similarly, the Taskforce on Climate-related Financial Disclosure (TCFD) has developed a set of climate-focused disclosure recommendations which have recently been endorsed by G7 countries to become mandatory. The ISSB has also announced that it will produce a biodiversity focused exposure draft, and the Taskforce on Nature-related Financial Disclosure (TNFD) is working towards the publication of its biodiversity standards.



PUBLIC PROCUREMENT AND GREEN SUPPLY CHAIN	Respondents indicated that procurement was an impactful intervention particularly in the Built Environment, Hospitality and Fashion sectors. In many countries, including Qatar, the government is a major procurer of services and owner of assets. Setting minimum sustainability standards and materials red lists for the procurement of goods for the government can be highly effective and encourage many private sector organisations, including in the built environment sector, to adopt these sustainability standards de rigueur	
RESEARCH AND INNOVATION	Consultations emphasised that Qatar has developed a strong political brand as a reliable international partner, and this is a solid platform to build on for economic diversification. Particularly in the Water and Energy sectors, participants emphasised the importance of more investment in innovation and new technologies. Participants suggested that this could unlock economic, environmental and social benefits through developing sustainable industries and technologies within Qatar. They proposed the creation of a Sovereign Wealth Fund which focused on research and innovation (including upskilling) for key sectors where Qatar aims to become a regional leader. For example, this could support the development of sustainable food production system adaptations for hot, arid environments and the recycling of construction waste.	
OPTIMIZING CONSUMPTION STRATEGIES	Shifting consumer behaviours can be the most cost-effective way of transitioning toward a circular economy. At present, Qatar is implementing legislation to ban or phase out unsustainable material through its recently introduced plastic bag ban. Similar schemes can be rolled out for other single-use plastics, as well as unsustainable textiles and construction materials. Shifting consumer behaviours can be the most cost-effective way of transitioning toward a circular economy. At present, Qatar is leading the way in the Middle East with legislation to ban or phase out unsustainable material through its recently introduced plastic bag ban. Similar schemes can be rolled out for other single-use plastics, as well as unsustainable textiles and construction materials.	
URBAN PLANNING AND ASSET MANAGEMENT	Extended producer responsibility (EPR) legislation for clothing, packaging, plastics and other materials would help support the development of an efficient and low-cost waste infrastructure. This includes building the facilities and infrastructure required for nationwide collection, transport and processing of recyclable or compostable waste. Such measures would create economic opportunities within Qatar, support environmental targets and ensure significantly less waste to landfill. Similarly, investments in recycling wastewater for industrial and agricultural uses as well as water conservation technologies will bring about economic and environmental returns.	
EDUCATION AND AWARENESSS	In all sectors except Energy respondents ranked a lack of education on the impacts of behaviours on the environment as in the top three most significant barriers to moving to a circular economy. Participants emphasised the importance of knowledge sharing platforms and data sharing. Internationally, government interventions have been found to be more effective when paired with public awareness campaigns, which could also build pride in a sustainable Qatar. This could include encouraging the purchase of Qatar-grown food to reduce carbon emissions and food waste associated with imports, domestic recycling and sustainable fashion. Building awareness of how different behaviours impact the environment can be a quick win for moving towards a more efficient, circular economy and instilling further national pride. In countries like Japan, Taiwan and Australia public education campaigns have played a leading role in fostering a strong recycling culture. Furthermore, public education campaigns are more effective when paired with initiatives to provide greater transparency about the environmental impacts of products, thereby helping consumers make more sustainable choices.	

# Economic diversification

## CONTEXT

The oil and gas sector accounts for nearly 28% of Qatar’s GDP and around 94% of total state revenue. As such, Qatar’s economy is exposed to geopolitical or market changes affecting these sectors.

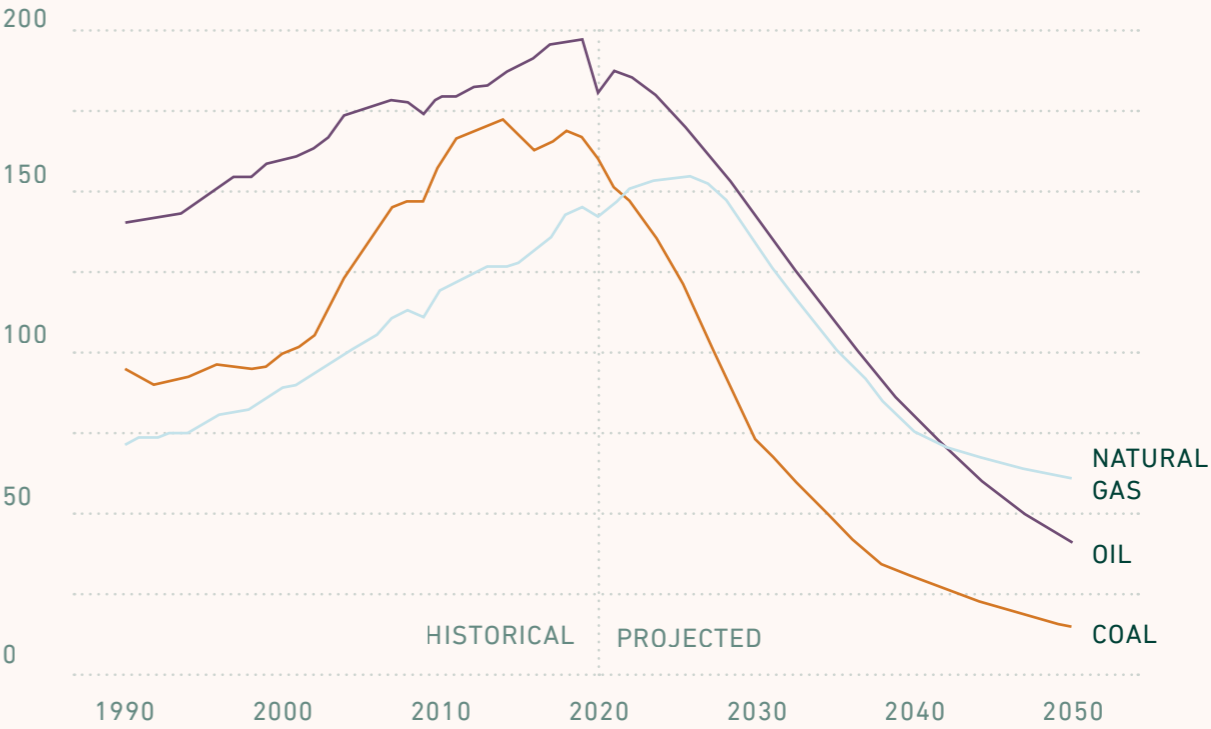
More than 80% of the world’s emissions are now covered by a net zero target. As global economies transition to net zero, diversification of Qatar’s economy through the development of innovative new industries will become paramount for ensuring continued growth and to avoid stranded assets. The International Energy Agency’s outlook has suggested that fossil fuels will peak in 2025 if existing international commitments are met. Although demand for natural gas will continue, under a net zero 2050 scenario, it will be just a quarter of today’s requirements.

One of the leading priorities of Qatar’s National Vision 2030 (QNV) is economic diversification. Areas of focus were the design and development of economic activities in which Qatar can specialize and develop a knowledge-based economy characterised by innovation and entrepreneurship. A key opportunity highlighted throughout the consultations was to invest in environmental and sustainable research and innovation to support the QNV aim of attracting foreign business, technologies and national investments. The 2017 blockade on the country accelerated diversification and has seen the emergence of new industries. In the National Development Strategy 2018-2022 (NDS) six sectors were identified as priority growth areas. These were: (i) manufacturing industries; (ii) financial services; (iii) professional and scientific activities; (iv) tourism; (v) logistic services; and (iv) information and communication. Qatar’s diversification efforts are also evidenced by its free zone entities which are focused on developing industries around emerging technology including advanced mobility, agri-tech, food-tech, and renewables, amongst others.

Through the consultations, a number of opportunities were identified both for transitioning away from fossil fuels and experiencing sustainable economic growth through harnessing sustainable prospects in new and evolving industries. Such opportunities included the health sector and tourism. Qatar has historically demonstrated prowess in these fields. The country’s healthcare system is considered one of the best in the world, whilst the execution of the 2022 FIFA World Cup has exhibited Qatar’s impressive industrial capacity and tourism offer on a global scale.

This report explores the diversification opportunities across all sectors.

FIGURE 4: INTERNATIONAL ENERGY AGENCY NET ZERO PATHWAY FOR FOSSIL FUELS



SOURCE: INTERNATIONAL ENERGY AGENCY

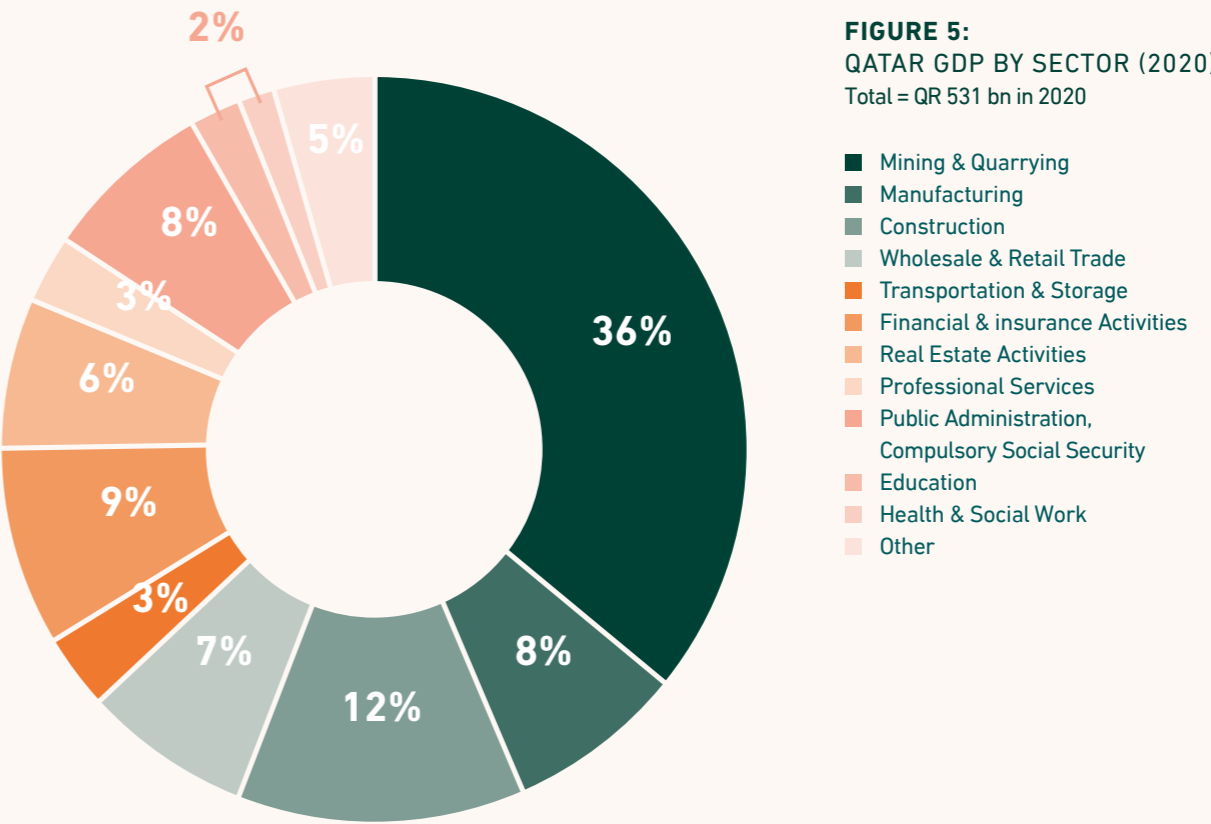


FIGURE 5: QATAR GDP BY SECTOR (2020)  
Total = QR 531 bn in 2020

SOURCE: QATAR PLANNING AND STATISTICS AUTHORITY

# Chapter 2

## Sectoral approaches

### Hospitality



"We need to drive change within communities"

#### CONTEXT

Within hospitality, tourism is a large and growing sector and an especially important one for Qatar's economy. Qatar's Second National Development Strategy (NDS) 2018–2022 identifies tourism as an important sector for Qatar's diversification, and therefore this report's primary focus within hospitality is tourism. The Persian Gulf attracts up to 44 million tourists a year. Hospitality is a non-hydrocarbon generated source of income for Qatar, accounting for nearly 0.6% of its GDP in 2020 and expected to reach \$55 bn by 2030.

The Qatar National Tourism Sector Strategy 2030 is a long-term strategy designed to support the development of the tourism industry in Qatar. The strategy aims to invest USD\$45bn to support tourism sector expansion by 2030 and hopes to achieve economic, social, cultural, and environmental benefits. It is a five-year strategy and contains many areas that support the circular economy. Part of this strategy involves diversification of tourism across six areas: (i) coastal and desert tourism; (ii) cultural tourism; (iii), business events; (iv), sports tourism; (v) urban and family entertainment; and (vi) cruise tourism. There are also aspirations to diversify tourist accommodation options. A major focus will be streamlining regulation processes to encourage investment. Qatar has a dedicated Investment Promotions Unit to facilitate and incentivise foreign investment in line with objectives set out in the Qatar National Vision 2030 (QNV), by creating a network of investors, local and international talent, and government authorities.

As global awareness of the issues surrounding sustainability grows there is increasing demand for ecotourism. The global ecotourism market reached US\$ 152.5 bn in 2021, and by 2027 is expected to reach US\$ 334.4 bn. This offers a significant opportunity for Qatar to capitalise on this. In recent years, Qatar has had success in growing sports tourism, having played host to several international sporting events and developed the associated stadiums and infrastructure. Notably, Qatar has hosted the 2022 FIFA World Cup and has recently won the bid to host the Doha 2030 Asian Games. As part of the preparations for the World Cup the Supreme Committee for Delivery and Legacy developed and mandated a Sustainable Resourcing Code, for hotels that wished to host the FIFA World Cup team. One way to comply with these standards was to hold a sustainable certification such as the Green Key award. Green Key certified establishments meet a set of high standard environmental requirements across 14 areas, including energy, water and environmental management. As highlighted in a report by the Economist, commissioned by Earthna, Mega events could be used to catalyse further growth and establish Qatar as a tourist destination of the future. There is a major opportunity to embed sustainability and circularity into a tourism growth plan from the outset.

In 2021 the Qatar Green Building Council (now Earthna) and Qatar Tourism began a collaborative partnership to embed sustainability into the country's hospitality industry. Targets centre around integrating certification schemes, such as the Green Key award. Another certification scheme adopted is the Eco-event award which is a rating system that provides measurable guidelines for low carbon event organisation. Other targets developed by Qatar Tourism include data sharing, enhanced media focus on positive sustainability approaches and developing a two-way framework to facilitate exchanges in tourism-related insights.

The private sector is taking steps towards sustainability with plastic reduction measures at many hotels. Hotel company

Katara Hospitality and Qatar Investment Authority, Qatar's Sovereign Wealth Fund, have partnered to develop Qetaifan Island North. It is a hospitality destination with a waterpark, luxury hotels, restaurants, and other tourist attractions alongside residential properties. The ethos behind the development is to build a sustainable city to support Qatar's long-term economic vision.

#### ENVIRONMENTAL IMPACTS

Globally, the hospitality sector consumes 5% of global water use and emits 1% of global GHG emissions. Hotel emissions in Qatar during 2022 are set to reach 1.3MtCO<sub>2</sub>e. The impacts of tourism go beyond emissions, as without sustainable management, tourism can threaten ecosystems. Coral reef exploration trips such as snorkelling and diving can lead to reef degradation without appropriate restrictions in place. Diver contact with corals can result in tissue abrasion, high incidences of coral disease and impact its ability to withstand climate change and coral bleaching events. In addition, the use of 'non-reef friendly' sunscreen negatively impacts reef ecology and can cause rapid and severe coral bleaching, as is already the case for 93% of coral reefs in Australia. In Qatar, only 2% of the marine resources still have recoverable coral reef ecosystems. Many endemic species, such as parasimplastrea corals that can only be found in the Gulf, are near to extinction. Coral species in Qatar are some of the most important on earth as they are genetically adapted to survive warmer sea temperatures. As such, they are a valuable genetic resource that could be used for restoring corals worldwide as sea temperatures rise.

Another coastal ecosystem that is threatened by tourist activities is Qatar's mangrove network. Due to significant urban development around Qatar's coastline many mangroves are being deforested, leading to hydrodynamic changes in Qatar's coastline in addition to the disappearance of many wetlands that used to be found in the intertidal zone. Tourist activities such as scuba diving, canoe trips, trampling and waste disposal are causing further direct degradation of these ecosystems. In addition to the impacts on coastal ecosystems, the hospitality industry is responsible for degradation of desert landscapes, particularly as a result of 'desert safaris'. Tourists are often unaware of the impacts of off-road driving on natural heritage. Desert trips can also cause degradation of natural resources, rivers and lakes as a result of vehicle pollution, discarded waste and negligent behaviour, all of which affect the desert ecosystem and its biodiversity to varying degrees.

#### CHALLENGES

According to the consultations, a significant barrier to circularity within the hospitality sector is the unaffordability- or absence of suitable alternatives to products and energy sources used by hotels and restaurants, with 37% of respondents naming this as one of the top three barriers preventing the hospitality sector moving towards a circular economy. An additional challenge identified was the lack of centralised guidance or standards, which means that hotels can create their own standards for sustainable practices. On the one hand, this offers flexibility and allows international chain hotels to adopt the same approach across their branches. On the other hand, local hotels have difficulty in developing their own sustainability practices and in understanding which approaches can have the most impact and generate cost savings.

Data sharing and availability was also raised as a challenge. Without a centralised approach to data gathering, storing and sharing, those in the hospitality sector have difficulty in understanding their approach's impact on the environment. There is also a missed opportunity to learn from best practice and monitor improvements over time. Consistent approaches to data collection would support the hospitality sector to make informed decisions. These challenges are not unique to Qatar, as internationally there are few interventions targeting the sustainability of the hospitality sector as a whole.

OPPORTUNITIES

The consultations helped to identify a number of opportunities within the hospitality sector. By embracing a circular model across the sector, Qatar could boost economic growth through increased foreign investment and a rise in the number of tourists. The rapid growth in global ecotourism represents an opportunity for Qatar to distinguish itself in the region and attract guests to its unique environment whilst protecting its biodiversity. Indeed, adopting a circular model would also enable Qatar to reduce waste and both water and air pollution. A common practice in hotels internationally is to have signs in bathrooms informing guests of environmental concerns and reminding them that at home they would not wash towels every day, with a Spanish hotel, and turning daily towel washing into an opt in service. Even a 3% reduction in the daily washing of towels could save 129,000 litres of water a year in just one hotel, as well as reduce CO<sub>2</sub> emissions by 1.7 tonnes. There is a key opportunity for this practice to be introduced across other areas such as energy and waste. In Qatar, enterprising businesses are already seizing these opportunities. Heenat Selma farm, a select overnight desert camping site based on an eco-farm, is an excellent example of this. Additionally, an 'eco-floating hotel' is planned for Doha in 2025, which is designed to decrease energy loss and reduce waste production.

The wider hospitality industry would benefit financially from the shift to a circular production model, which would reduce energy and water costs through measures aimed at decreasing consumption. Ways to do this could include for practices such as sourcing food locally and sending food waste to farms as compost or animal feed. This could also extend to hotel-specific initiatives such as hotels having their own herbal gardens and using roof gardens for food production.

CASE STUDY  
QATAR - THE MONDRIAN

The Mondrian, Doha, has adopted a water refill policy, allowing bottles to be refilled throughout the property.










Although Mondrian's initial investment in its initiative was significant, the hotel managed to reduce its costs by QAR 12,000 (\$3,287) per month. One of the challenges identified at the workshop was that hotels can often make decisions based on the short-term rather than longer-term returns. Mondrian's long-term cost reduction demonstrates that sustainable initiatives can be cost effective.

POTENTIAL INTERVENTIONS IDENTIFIED

A number of approaches were discussed during the course of consultations. While hotels vary in size and other characteristics, shared standards that can be adapted to different needs were identified by 39% of respondents as important for improving circularity. A holistic approach is needed which integrates interventions across different sectors including water, food, and waste packaging. Improved green procurement practices were proposed by 41% of respondents as a high impact intervention.

The consultations proposed sustainability incentives for hotel staff and guests. These included the creation of reward programs or redeemable points, both of which have been proven to be effective ways to promote the adoption and implementation of sustainability practices in the hospitality sector. Hotels could also be encouraged to reward members who recycle items such as plastic bottles with discounts. The adoption of these practices could be facilitated through "hotel alliances" to encourage sustainability within the industry.

The consultations also highlighted improved education and awareness as an intervention needed in the hospitality sector, with 44% of respondents suggesting it could boost circularity. Public information campaigns and the signposting of sustainable activities within hotels are likely to be most effective way of educating individuals. A similar model which encourages tourists to adopt more environmentally conscious behaviour during their hotel stays could be implemented across the Qatari hospitality sector.

HOSPITALITY CIRCULARITY PATHWAYS		EXISTING EFFORTS			PATHWAY RECOMMENDATION	DETAILS OF IMPLEMENTATION
		LOW	MEDIUM	HIGH		
STRATEGIC COMMITMENT		<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	Build on Qatar National Tourism Sector Strategy 2030	Undertake a stock- take of progress from 2014 to 2022 and an update of recommendations including introducing a holistic delivery plan to support the hospitality sector to become more sustainable, building on the successes of the World Cup 2022.
ECONOMIC INCENTIVES & FINANCE SUPPORT		<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	Financial incentives for individuals and businesses that recycle	Rewarding businesses, staff and guests who adopt and implement sustainability practices, or creating incentives such as providing redeemable points e.g., hotel points for recycling, opt-in service for bedding and towel washing.
DATA COLLECTION & MONITORING		<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	Tourism 'insights' data collection programme	Data collection on visitor numbers to different areas in Qatar and different holiday 'types' e.g., specific data on tourist appetite for ecotourism vs traditional tourism to shape targeted interventions. More comprehensive data gathering on the impacts of tourists on Qatar's natural environment and biodiversity.
EMBEDDING CIRCULAR PRACTICES		<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	Consistent regulatory standards	Adoption of ISO standards – to set consistent standards which specify the environmental, social and economic requirements for implementing a sustainability management system in tourism accommodation. These address issues such as human rights, health and safety, environmental protection, water and energy consumption, waste generation and development of the local economy.
EDUCATION & AWARENESS		<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	Increase awareness of guests and staff of sustainable approaches	An issue highlighted during consultations was the lack of awareness on sustainability. Some guests use single-use plastic as they believe them to be to be more hygienic although they can expose people to harmful chemicals. Internal training for staff and visual aids for guests (e.g. not washing towels each day, switching off lights, displaying information on the benefits of reducing single-use plastics) would help to increase awareness and change perceptions.
RESEARCH & INNOVATION		<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	Data and insight sharing and collaboration	Hotel alliances to share knowledge and work to develop a centralized approach to sustainability and/or achieving ISO certification, as well as transparency from the government on relevant policy initiatives for the industry would aid education and uptake of sustainable initiatives. These could include the use of technology such as QR codes, guest room management systems and digital check in and out.
OPTIMIZING CONSUMPTION STRATEGIES		<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	National data collection for water and electricity	Metering of water and electricity usage by all hotels, collected by KAHRAMAA and used to assess high usage areas and target interventions for reductions.
PUBLIC PROCUREMENT AND GREEN SUPPLY CHAIN		<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	A holistic sustainable procurement policy for the tourism sector	This could include sustainable procurement policies for food and beverage/housekeeping, eco-labelling, supply chain transparency, data collection and availability, and reward schemes for guests on being sustainable.
URBAN PLANNING & ASSET MANAGEMENT		<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	Incentives for sustainable hospitality developments	Financial incentives for sustainable hospitality, including subsidized recycling facilities renewable energy tax credits, incentive pricing for sustainable water and energy production (e.g., solar power and treated wastewater).



# Water



Water is at the core base of life on Earth. It is one of the most important resources to manage sustainably”

## CONTEXT

As noted by the World Resources Institute, Qatar suffers from extreme water stress. Water scarcity has been a major concern throughout Qatar’s history. Water demand for domestic purposes uses more than 40% of the available freshwater supply, making Qatar vulnerable to even temporary shifts in rainfall patterns. In 2016 alone, there was a shortfall of 102 million m3 per year between the groundwater consumption rate and the natural recharge rate. The annual water consumption more than doubled between 2006 and 2019.

Qatar has one of the highest per capita water consumption rates in the world, at around 500 litres per capita per day. Most of the demand for water comes from the agricultural (37%) and domestic (43%) sectors. However, the highest growth rate in demand between 2006-2019 was in the industrial sector (+20%) and government sector (+15%), whereas demand for water in the agricultural sector stayed level. Demand for water is predicted to increase in the next few decades, with pressure on wastewater networks and groundwater likely to grow as a result of demand for the irrigation of fodder, green landscapes, district cooling and a growing population. Over 39 million m3 were discharged into lagoons in 2015 rather than reused.

Despite the growing demand, Qatar has been highly successful in reducing wastewater over recent years. The National Programme for Conservation and Energy Efficiency, Tarsheed, succeeded in reducing per capita consumption of water by 20% between 2012 and 2016.

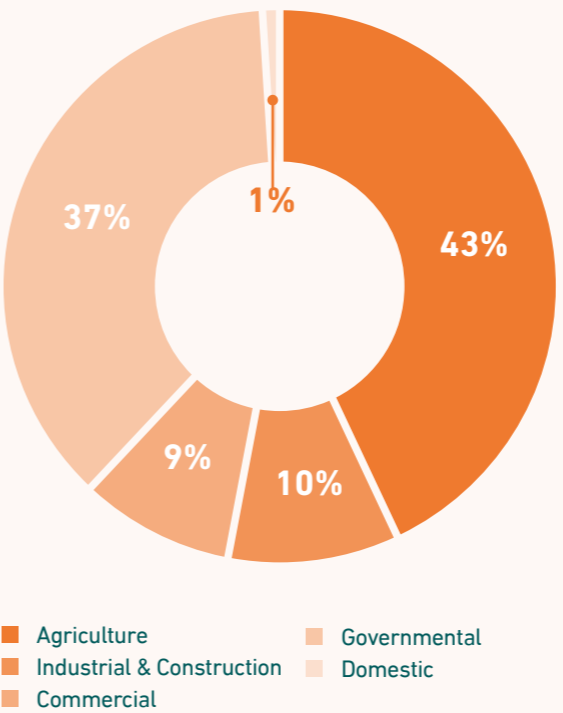
As part of the NDS (2018-2022) a target was introduced to reduce the consumption of water by a further 15% by 2022 through Tarsheed. In order to enhance these efforts, the National Environment and Climate Change Strategy (2021) has established sustainable water management as one of its five main priorities, and within the strategy there are targets to reduce groundwater extraction by 60%, reduce daily household water consumption by a third and double desalination via reverse osmosis or more sustainable technologies.

In 2018 the Qatar General Electricity and Water Corporation (KAHRAMAA) started the complex process of installing metering systems at groundwater wells in farms. By 2018 17,000 water meters had been installed with the aim of making them smart by 2024. The use of water meters has already enabled KAHRAMAA to make progress towards addressing water leaks in the network. In addition, the government has signed a memorandum of understanding with WadiWater, an Agri-tech company that specialises in the production of mineral water from air humidity, which will enable the company to provide innovative irrigation solutions that reduce water waste. This will build on the work WadiWater had been doing in Qatar testing atmospheric water generators that can extract humidity from the air and produce potable water.

The NDS 2018-2022 also aimed to provide infrastructure to increase the use of treated sewage effluent (TSE) water from 56% to 70%, and to establish a programme for the integrated management of water and of accompanying contaminants in industrial zones by 2022. Further targets from the NDS 2018-2022 include improving coastal and marine water quality in addition to developing a coastal and marine water quality control plan.

As Qatar has been under pressure to adapt to water scarcity for thousands of years, it is a valuable repository of traditional and institutional knowledge which could provide an important contribution to the global efforts to address climate change.

**FIGURE 6:**  
QATAR WATER CONSUMPTION BY SECTOR (2014).



ENVIRONMENTAL IMPACTS

In 2019, the main source of total water production in Qatar was from sea water desalination (63%), followed by ground-water abstraction (23%). This is significantly higher than the average in the MENA region of 3% of water production from seawater desalination. Desalination is an energy intensive process and a significant source of emissions, producing around 80 MtCO2 per year. This is likely to rise to 500Mt CO2 per year by 2040, owing to rising demand.

Electricity and water use in the domestic sector was estimated to contribute 18.7Mt CO2e or 16% of Qatar’s greenhouse gas emissions in 2019. As mentioned in the NDS 2018-2022, the production of desalinated water in Qatar depends on oil and gas which not only are responsible for the high levels of emissions, but also for pollution and other types of environmental damage.

Qatar groundwater supplies are highly depleted, with groundwater used extensively for irrigation. Moreover, the quality of the groundwater is often compromised by pollutants linked to anthropogenic activities on land, such as nitrate, which can leak into the ground and into water reservoirs. There are increasing concerns about possible adverse effects of the desalination process on the environment. In particular, brine, a by-product of the process which is discharged into the marine environment along with chemical residues, has a very high saline content and can contribute to the contamination of habitats, the poisoning of marine aquatic organisms and the bleaching of coral reefs. The deterioration in seawater quality and increase of salinity levels near desalination plants also negatively affects mangrove habitats.

CHALLENGES

During consultations a number of challenges were identified in the context of the water sector. A lack of infrastructure to deliver water was identified by 36.6% of respondents as being one of the major challenges. An additional 28.2% believed that sustainable alternatives would be prohibitively expensive.

The consultations also identified the significant losses due to leakages as an issue. In 2011 alone, around 30% of water from Qatar’s desalination plants was lost due to leakage in the network. The introduction of advance leak detection technologies and the use of smart water meters has enabled KAHRAMAA to make progress towards addressing water leaks in the network, but greater innovation is needed to reduce waste. With regard to this, 19.7% of respondents to the consultations pointed to insufficient levels of funding for innovation and technologies to improve water management.

The consultations referred to the absence of financial or policy incentives for industries to embrace water efficiency as a challenge. Irresponsible irrigation was raised as a significant contributor to the worsening of the water table imbalance in Qatar. Independent extraction of ground water by some industries also contributes to water problems in Qatar, with lack of reporting on amounts and usage being flagged during the consultations as a further issue.

The NDS 2018-2022 also highlighted the challenges presented by the absence of an independent and integrated water regulator. Coordination among stakeholders in Qatar has been impeded by the absence of integrated management which, in turn, presents an obstacle, including the need for the development of a comprehensive and up-to-date database on various water resources. This issue was raised during the consultations, where 25.4% of respondents drew attention to the low level of collaboration and knowledge sharing among different government bodies and state institutions in designing policies on water. Information gaps were highlighted as a problem by 20% of respondents. This particular combination of issues contributes to short-termism with regards to decision-making, which 25% of respondents also considered a serious challenge.

The lack of available data was cited by 13% of respondents as one of the main barriers to circularity in the water sector. The consultations called attention to the challenges that stem from the scarce metering of water usage. ‘Lumped’ utility bills mean that residents are unaware of how much water they are using, which can contribute to excessive consumption. Furthermore, the lack of reporting requirements means that currently there is no simple mechanism for penalising an over consumption. According to 41% of consultation respondents, the low level of policy enforcement is one of the three most significant barriers to circularity within Qatar’s water sector. Inadequate education on the environmental impact of human behaviours was identified as a leading challenge by 37% of respondents, followed by skills gaps which were flagged by 13% of respondents.

OPPORTUNITIES

Moving to a more circular economy can help reduce water use. Baladna have invested USD\$ 25m in a water treatment plant which has helped reduce consumption by 50%. Re-using wastewater on a much larger scale, particularly within the agricultural industry, can also save water. Countries in the MENA region already generate 18.4km3 of municipal wastewater per year. Using treated wastewater rather than desalinated water for agriculture provides and an opportunity for both energy and cost savings. The cost of desalinating water is more than double the cost of treating wastewater. Using TSE in cooling systems also enables energy savings. With little or no treatment, greywater can replace more expensive water resources for several purposes, especially garden irrigation and landscaping. In Qatar, recycling greywater can mitigate the growth of Qatar’s water expenditure by slowing the increase in demand for desalinated seawater and retreated wastewater. Estimated annual savings range from QAR 50m to QAR 755m.

By reducing water consumption through increasing the use of techniques such as drip irrigation to ensure water savings and increased crop growth in arid regions, Qatar could significantly enhance the circularity of its water industry. In turn, this would reduce reliance on desalination and groundwater supplies.

CASE STUDY  
SAUDI ARABIA – SOLAR DESALINATION

Saudi Arabia has pioneered efforts to implement solar desalination within the country. The country’s Water Desalination Project at the AlKhafji plant utilises solar photovoltaic power to power reverse-osmosis desalination technologies, and produce 60,000m3 of clean water daily. Inaugurated in 2018, the plant has a capacity of 10MW and is capable of processing 90km3 per day.<sup>1</sup> The project is expected to reduce costs, allowing for more energy to be sold on the global markets.

The project is part of the country’s wider ‘Vision 2030’ plan, and the country has committed to redouble its efforts within solar desalination going forward as part of the planned Neom sustainable city. Through a ‘solar dome’, an array of mirrors will concentrate solar radiation for desalination and producing a lower level of brine than facilities in traditional reverse-osmosis technologies. Furthermore, the country’s ambition to accelerate solar desalination is also expected to generate a cost benefit, with water processing taking place at a rate of 34 cents per m3, lower than conventional plants.<sup>2</sup>

- 1 Vision 2030 Kingdom of Saudi Arabia, “Water Desalination Project Using Solar Power”, (undated), [www.vision2030.gov.sa/v2030/v2030-projects/water-desalination-project-using-solar-power/](http://www.vision2030.gov.sa/v2030/v2030-projects/water-desalination-project-using-solar-power/).
- 2 The National UAE, “Saudi Arabia plans to use ‘solar dome’ to desalinate water in Neom”, 2020, [www.thenationalnews.com/business/energy/saudi-arabia-plans-to-use-solar-dome-to-desalinate-water-in-neom](http://www.thenationalnews.com/business/energy/saudi-arabia-plans-to-use-solar-dome-to-desalinate-water-in-neom).

POTENTIAL INTERVENTIONS IDENTIFIED

As the domestic sector makes up such a significant proportion of water usage, there is an opportunity to target interventions. The consultations highlighted the following as some of the changes with the highest potential for impact:










- 1 awareness raising campaigns and further education on efficient consumption and the use of recycled wastewater as a drinking source (44% of respondents);
- 2 penalising those who had an extreme consumption of water through taxes or fines (31% of respondents); and
- 3 ensuring that residents have access to more sustainable business equipment (27% of respondents).

Commercial and domestic metering to monitor usage and incentivising residents and businesses to decrease their consumption were also discussed during the consultations as potentially impactful measures. Smart metering could be extended across different sectors and cover both commercial and domestic use of water. As suggested in the NDS 2018-2022, such measures would be preferable to the imposition of tariffs on groundwater, which may nonetheless be adopted as a measure of last resort during emergencies such as droughts. Some respondent proposed eliminating government subsidies for water and electricity to incentivise further sustainable consumption.

The respondents also proposed increased investment in water conservation strategies and the expansion of treated wastewater reuse and its commercialisation, including through individual businesses having their own wastewater treatment plants. Respondents suggested using ablution water for landscaping. In addition to enhancing wastewater reuse practices, the government could also incentivise sustainable water usage, be it through sustainable or green procurement incentives (20% of respondents), subsidies for green companies (11% of respondents) or carbon credits (10% of respondents).

The introduction of new regulations on sustainable standards of water was considered by 41% of respondents to be a highly impactful policy, as would greater transparency on the sustainability and environmental credentials of products (14% of respondents).

Additionally, 44% of consultation respondents highlighted innovation and technology as notable opportunities for the achievement of greater circularity in the water sector, including through the capture of humidity in the air and from AC units, the development of green walls, and the prioritisation of water sensitive urban design. Responses also drew attention to the need for greater investment in these fields. As an arid country with decades of valuable experience working to find water saving solutions, Qatar can become a global leader in driving water security through innovation and research and development.

WATER CIRCULARITY PATHWAYS		EXISTING EFFORTS			PATHWAY RECOMMENDATION	DETAILS OF IMPLEMENTATION
		LOW	MEDIUM	HIGH		
STRATEGIC COMMITMENT		<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	Water resources policy and publication of national strategy	Publish and set time-bound key performance indicators based to demonstrate commitment to sustainable water use in Qatar.
ECONOMIC INCENTIVES & FINANCE SUPPORT		<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	Tiered pricing system based on usage	Ensure existing subsidies for water and electricity are favoured, use incentive pricing for sustainable water and energy production (e.g., solar power and treated wastewater). Unsustainable sources could be disincentivised e.g., water usage up to a certain amount (depending on farm size) is charged at the current subsidised rate but anything over that is charged at a higher price, i.e., reflective of the true cost of water production.
DATA COLLECTION AND MONITORING		<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	National data collection for water and electricity	Accelerate roll out of smart meter installation across domestic and commercial settings to enable water usage to be recorded and visible to households.
EMBEDDING CIRCULAR PRACTICES		<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	Minimum Liquid Discharge for all water treatment plants	As highlighted in consultations, the principle of MLD in water recovery has the potential to have a positive impact on the environment. Currently, existing 'zero liquid discharge' based approaches to conserve resources are too energy intensive, with MLD using filtration-based technologies that can achieve high water recovery whilst conserving energy investment costs.
EDUCATION AND AWARENESS		<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	Develop campaign to build a wareness around wastewater	Assess the effectiveness of Tarsheed programme to date, use monitoring and insights to build on campaign effectiveness.
					Shifting to renewable based desalinisation regulation	Working with relevant stakeholders (e.g., Qatar Energy and Water, Qatar Foundation) to develop a campaign to change public perceptions of treated wastewater for agricultural products and domestic use.
RESEARCH AND INNOVATION		<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	Greywater recycling	Shifting to renewable energy-based desalination to reduce the emissions from and the energy costs of desalination plants
OPTIMIZING CONSUMPTION STRATEGIES		<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	Greywater recycling	A mechanism to support the Tarsheed national awareness campaign and tariff increases in Qatar (which so far has reduced per-capita water consumption by 17%) could be recycling greywater.
PUBLIC PROCUREMENT AND GREEN SUPPLY CHAIN		<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	Metering for public buildings	The government could introduce water metering for government owned buildings to increase awareness of water usage.
URBAN PLANNING & ASSET MANAGEMENT		<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	Regulation to mandate water leakage across the network is monitored and addressed	Advance leak detection technologies and the use of smart water meters to enable better assessment of the water network and to reduce leakages and losses in the water supply system.



# Plastics, Textiles, & Packaging



The management of waste in Qatar is at its core a means of achieving better human health, environmental protection and economic development”

## CONTEXT

Globally, plastic waste is a significant problem. Over 380Mt are produced annually. In 2015 only around 20% of plastic was recycled, with 25% being incinerated and 55% discarded. Despite the fact that plastic recycling techniques have existed since the 1970s, plastic recycling remains a significant challenge.

Qatar has taken steps towards reducing the use of plastics and improving the sustainability of its textiles industry. Qatar’s Integrated National Solid Waste Management Programme was launched in 2022 and highlights Qatar’s goal to mitigate waste through private sector partnerships and education. At the time of writing, the cabinet approved draft law on the treatment and recycling of waste has not yet been passed. The 2018-2022 National Development Strategy (NDS) sets targets to increase recycling to 15% by 2022 and to reduce per capita domestic waste production to under 1.6k per capita/day. The Solid Waste Segregation Mandate has been in force since October 1st, 2022, and requires all institutions and authorities to segregate solid waste at source and provide containers for sorting waste. It is reported that Qatar will take strict action against entities that fail to comply. Qatar is also introducing a ban of single-use plastics which was set to come into effect in 2022.

Alongside legislative initiatives, private sector-led schemes have the potential to spur on behavioural changes in product consumption and disposal patterns. As seen in schemes such as Al Meera’s initiatives to incentivise consumers to recycle their goods and use reusable bags, and Hamad Bin Khalifa University’s innovative reward-based waste exchange platform. The Pearl-Qatar has also taken steps to address plastic waste through the installation of ‘sea bins’. The bins have been installed in 10 different locations, with each bin so far collecting almost 4kg of water pollution. The bins can filter 2Ml of water per day and have the capacity to collect up to 1.4t of debris per year. Campaigns such as Unwasted Qatar are working to encourage brands and consumers to adopt a more sustainable lifestyle.

For this report we have focused on the two biggest sources of plastic waste - textiles and packaging. Globally, packaging accounts for around 140Mt of plastic waste each year, and textiles around 92Mt each year.

## ENVIRONMENTAL IMPACTS

Qatar has one of the highest per capita waste generation rates in the world at around 1.8kg per day. This is, in part, attributed to an “excessive consumerism culture”. Of this waste, the majority goes into landfill, with only 8% of Qatar’s waste being recycled. Since the pandemic, single-use disposables and plastics have been on the rise in Qatar. Plastic waste accounts for around 13% of Domestic Solid Waste.

Plastic waste is a significant source of environmental damage. The accumulation of plastic waste on the roads and beaches around Qatar continues to pose threats to public health and the environment. Plastic waste is found in 90% of the world’s sea birds and 50% of the world’s turtles. Globally, textiles are the largest source of microplastics in the oceans, contributing to 35%. Microplastics are harmful to the environment since they can contaminate waterways and poison animals who digest them. As a result, they can also enter the human food chain. On a global scale, it is estimated that of all primary microplastics in oceans, 35% are the result of washing of synthetic textiles.

A small but significant proportion of waste in Qatar is incinerated (4%). This can have significant impacts on health and a knock-on impact on the economy. Incineration is energy intensive and can produce high levels of greenhouse gases such as methane, and other air pollutants. The NDS 2018-2022 identified air pollution as accounting for more than 55% of the environmental costs to Qatar. Poor air quality also accounts for 250 premature deaths a year in Qatar.

The majority (~90%) of waste in Qatar is placed in landfill. Pollution is also an important concern in the case of landfilling. In addition to potentially damaging ecosystems through the development of a landfill site, which could destroy reproduction sites for multiple animal species as well as natural carbon sinks, landfills are responsible for leaks of toxic substances into the environment. The leakage of leachate from landfill sites can also result in toxic chemicals being released into the ground and water supply in addition to the release of methane into the atmosphere. In the fashion industry the use of pesticides, fertilisers and chemicals (carcinogens, hormone disruptors, harmful materials that include flame retardants, AZO dyes, chromium and formaldehydes) used by clothing manufacturers are a major cause of pollution in oceans. These enter the water system through the washing of textiles.

CHALLENGES

The consultations identified several challenges. First, a significant obstacle to the adoption of circular principles in the packaging sector stems from the limits of the recyclability of materials. Respondents drew attention to the absence of a recycling program for glass which leads to further landfilling and does not provide Qatari inhabitants and manufacturers with a sustainable alternative to plastic. As such, 44% of survey respondents identified a lack of suitable alternatives as a top three barrier to phasing out use of plastics. Second, there is no government operated recyclable waste collection system in place for households, who must instead rely on private collection. This resulted in 70% of survey respondents citing a lack of suitable infrastructure or policy intervention as a significant barrier. Further, the absence of a centralised program also leads to the mixing of organic and recyclable household waste which results in contamination, thereby further reducing recovery rates.

Additional challenges were identified by respondents on phasing out the production of plastics in favour of alternative materials. These challenges stem from the economic role of the plastic sector in Qatar. Whilst plastics only represent 3% of Qatari exports, plastic manufacturing is closely connected to oil and gas extraction and refining. Since plastic production can act as a safety net for petrochemical companies when oil prices fluctuate, the risk of cross-sectoral economic ramifications presents a challenge. Consequently, 26% of respondents in the consultation regarded short-term economic objectives as a significant barrier to reducing plastic waste.

On fashion, a leading challenge identified was a societal pressure to avoid wearing the same clothes twice which has led to significant demand for fast fashion. Indoor malls are a staple to most resident’s lives and clothes shopping is a regular pass-time. Similarly, 40% of survey respondents cited inadequate education on the impacts of such behaviours as a significant barrier to reducing fashion waste. Furthermore, there is an absence of registered mechanisms for selling second-hand clothes, with the only option currently being Instagram- resulting in 30% of respondents saying a lack of sustainable alternatives is a barrier to circularity in the fashion sector. This, combined with the fact that clothes donations can only be done through registered charities, means that most clothing items in Qatar have a short lifecycle.

A second challenge for the recycling of textiles is the complexity of recycling mixed textiles. Although textiles recycling initiatives can be implemented to extend the lifecycle of garments, the absence of widespread technical expertise on the segregation of textiles is an obstacle to the recycling of clothing and other textiles in Qatar, which is a barrier cited by 30% of respondents in consultations. Shredding of textiles was suggested in the consultations as the easiest form of recycling, since it produces materials which can subsequently be used in furniture and upholstery.

Another challenge, common to other sectors discussed in this report, derives from Qatar’s dependence on imports. According to the World Bank, Qatar manufactures less than 1.4% of its own textiles and clothing, the rest of which

are imported. This means that supplier-based legislation aimed at improving the sustainability of the sector must also be applicable to imported clothing if it is to be effective. There are limited manufacturers with the capacity to produce sustainable clothing in Qatar so even sustainable fashion companies need to import goods. This causes environmental strain and prevents manufacturers from having competitive pricing with other non-eco-friendly clothing lines. Some manufacturers of eco packaging exist, but their products are mostly limited to food packaging.

OPPORTUNITIES

The consultations highlighted- with 32% of answers- that by enhancing the circularity of the fashion industry and developing new domestic industries, Qatar could lay the groundwork for the development of a new second-hand clothing market. Given the cultural significance of buying new clothes and fast fashion in Qatar, 40% of respondents also suggested that initiatives to drive second-hand markets would likely benefit from education programmes and the involvement of high-end influencers in order to deliver a positive message about sustainable fashion. Consultation respondents argued that education on consumer behaviour and its effect on the planet is key to reducing the reliance on fast fashion and enabling the market to move toward sustainable fashion trends. The government could also provide subsidies for the production of sustainable clothing and packaging.

Adopting a circular economy model would decrease consumption of raw materials. More plastic is created each year to generate polyester, which is used largely to produce textiles, than is created for plastic bottles. However, the creation of recycled polyester uses significantly less energy than virgin sourced polyester (between 30 to 70%), although the exact savings vary depending on the materials and processes. The advantages of reusing and recycling materials that would otherwise go to waste through the development of circularity streams was raised during the consultations, with 60% of respondents offering this as a solution to plastic waste. Not only would this approach decrease Qatar’s reliance on raw materials, but it would also reduce costs for manufacturers.

Finally, there are significant opportunities for innovation. Making the fashion industry in Qatar more circular will require innovative techniques, not only through the engineering of more sustainable textiles but also through the redesign of clothing to increase durability and recyclability of textiles. According to the consultations, the availability of government subsidies to support sustainable production of clothes and grants for innovation into sustainable textiles (such as using recycled plastics) would provide a helpful boost in this direction and would enable Qatari manufacturers to position themselves competitively within the global market, with 64% of respondents supporting such interventions. Nevertheless, the fact that key constituents of fabrics may need to be sourced internationally remain important challenges for the adoption of a sustainable and circular model.

CASE STUDY  
EU - REVISED PACKAGING AND PACKAGING WASTE REGULATION

First adopted in 1994, the EU Packaging and Packaging Waste Directive (PPWD) sets mandatory measures on packaging and the management of packaging waste, including plastic.<sup>1</sup> Most notably, as part of the PPWD, the EU has mandated recycling and re-use targets as well as the creation of Extended Producer Responsibility (EPR) schemes across all member states by 2024. EPR schemes place a financial and physical burden for the collection, recycling, and disposal of packaging upon producers, aiming to promote waste reduction and circularity. This incentivises parties throughout a product’s supply chain to prevent waste and promote product eco-design.

The PPWD aims to enhance existing measures including through introducing minimum percentages of recycled content in plastic packaging, mandating consistent EU-wide labelling requirements, and adding incentives through introducing reduced EPR fees if more environmentally friendly materials are used. Furthermore, EPR schemes are likely to present wider benefits; existing fee-based schemes guarantee an ongoing funding stream to authorities. On average, countries with mandatory EPR schemes also achieve a higher recycling collection rate of 40%, in contrast to countries with limited or no EPR (15% and 10% respectively).<sup>2</sup>

1 EU Commission, “Packaging Waste”, (1994), EUR-Lex - 31994L0062 - EN - EUR-Lex (europa.eu)

2 Ellen MacArthur Foundation, “Extended Producer Responsibility”, 2021, <https://emf.thirdlight.com/link/cp8djae8ittk-xo55up/@/#id=0>










POTENTIAL INTERVENTIONS IDENTIFIED

The consultation feedback focused mainly on the consumer difficulties in accessing recycling facilities. Interventions which focused on improving the convenience of recycling, alongside education campaigns, were proposed to be highly effective. Introducing EPR legislation was suggested as a low-cost way to improve infrastructure around waste recycling. Since being introduced in the 1990s in countries such as Germany, Sweden and France, many countries have seen significant increases in recycling rates as well as reductions of public spending on waste management.

Respondents also proposed the introduction of policies which include taxes or fines on ‘unsustainable’ goods, subsidies for sustainable companies or mandatory ESG reporting. In fact, 96% of survey respondents stated either government taxes, fines or bans on plastics to be an effective option to address waste. The Qatari government could also incentivise producers to make their products more sustainable, including through encouraging households to use re-usable containers and supporting the growth of food refill stations, for example.

The replacement of non-sustainable plastics with natural materials, including the elimination of plastic for certain items such as water bottles, was suggested in the consultations. Respondents suggested that the phase out of plastic use should be accompanied by the development of new industries to prevent economic fallout. This could also be used to drive the development of new innovative industries in Qatar.

Respondents proposed regulation for the textile sector to ensure companies that market their products with phrases such as ‘eco-conscious, environmentally friendly and sustainable’ can back-up their claims with verifiable, transparent data. These could be through the introduction of a “green claims code” may help to prevent greenwashing. Other proposals for textiles included incentives to increase the development of thrift stores and the enhancement of fabric recycling.

PLASTICS, TEXTILES AND PACKAGING CIRCULARITY PATHWAYS		EXISTING EFFORTS			PATHWAY RECOMMENDATION	DETAILS OF IMPLEMENTATION
		LOW	MEDIUM	HIGH		
STRATEGIC COMMITMENT		<div><div></div><div></div><div></div></div>			Qatar leadership	<p>A continuation of the ‘Made in Qatar’ initiative to reflect the values set in the country’s sustainability vision. This could support the development of a sustainable plastics and fashion industry. People not only created more Qatari products but there was pride in purchasing them.</p> <p>Follow the recommendations of the second QNV to legislation to encourage waste recycling, including methods of dealing with waste, binding ratios and incentives.</p>
ECONOMIC INCENTIVES & FINANCE SUPPORT		<div><div></div><div></div><div></div></div>			State run meta-standard for sustainable textile imports/production	Introduce a deposit-refund system (DRS) for plastics/other recyclables. It can be voluntary or mandated by legislation. The financial incentive to return recyclable materials promotes circularity by re-using recyclable materials that would otherwise be disposed of in landfill.
DATA COLLECTION & MONITORING		<div><div></div><div></div><div></div></div>			Report/ appraisal of the fashion industry in Qatar	Currently there are extensive data gaps within the Qatari fashion industry that prevent the creation of evidence-based policies. A review of current trends (fashion industry value, tonnes of clothing waste, current recycling rates and capability in country) and effectiveness of results from ‘Unwasted’ and other behaviour change campaigns would enable targeted interventions
EMBEDDING CIRCULAR PRACTICES		<div><div></div><div></div><div></div></div>			A ban on single-use plastic	As noted by survey respondents, a ban on single-use plastic could be expanded to incorporate a wider phase-out.
EDUCATION & AWARENESS		<div><div></div><div></div><div></div></div>			Plastic waste awareness campaign	<p>A ‘focus on plastics’ educational campaign centred around the proposed legislative changes and incentive schemes would ensure understanding and buy-in.</p> <p>E-labelling to increase transparency around the sustainability of a product alongside a “Green Claims Code” to ensure that sustainability claims are underpinned by data.</p>
RESEARCH & INNOVATION		<div><div></div><div></div><div></div></div>			Manufacturing innovation	Investment in new innovative manufacturing techniques and approaches to reduce the waste produced.
OPTIMIZING CONSUMPTION STRATEGIES		<div><div></div><div></div><div></div></div>			Single use plastic fee	A voluntary scheme to disincentivise single-use plastic and promote use of more sustainable materials – a small charge is payable for using plastic and glass/biodegradable alternatives are provided for a deposit.
PUBLIC PROCUREMENT AND GREEN SUPPLY CHAIN		<div><div></div><div></div><div></div></div>			Chemical and sustainability standards for imports	<p>Chemical regulations for clothing imported to Qatar. Manufacturers and importers would need to ensure that their products comply with substance restrictions i.e., EU’s REACH Directive, which regulates dangerous chemical substances in consumer products, including apparel and textiles. A materials red list is the norm in most countries. This is something that is not fully enforced in Qatar, e.g., certain food and textile colourings are banned in Europe but are being allowed into Qatar.</p> <p>A Qatar run ‘meta-label’ (like the German ‘Green Button’) which can be achieved through a company having obtained one or more existing ‘approved’ certifications, such as GOTS, Bluesign. This label would require companies to demonstrate that that they undertake sustainable practices in their supply chains.</p>
URBAN PLANNING & ASSET MANAGEMENT		<div><div></div><div></div><div></div></div>			Domestic and commercial recycling infrastructure	EPR legislation for clothing imports to Qatar (including entire lifecycle of products e.g., in the take-back, recycling, and final disposal of their products and packaging). This could be done through a phased introduction to cover certain material types/sectors and would ensure that polluters cover the cost of recycling infrastructure.



# Food & Domestic Waste

“Reduce consumption, increase recycling to create less waste and more jobs”

## CONTEXT

More than 900Mt of food, or 16% of total food available to consumers in 2019, went into the waste bins of households, retailers, restaurants and other food services. . Whilst drivers of waste within the sector may vary, the problem is global and exacerbated by exogenous factors such as rapid population growth.

In Qatar, more than 2.2Mt of municipal solid waste is generated each year. Household food waste per capita is 95kg per year, significantly above the global average of 74kg. This waste is mainly comprised of organic materials (~60%) while the rest is made up of recyclables like glass, paper, metals and plastics. There are currently no government operated recyclable waste collection systems in place for domestic waste, and statistics show that only 3 to 6% of solid waste is recycled. However, the 2018–2022 National Development Strategy (NDS) includes targets and goals related to waste management, notably to fix the domestic waste generation rate to under 1.6 kg per capita/ day, and recycle 15% of the solid waste generated by the end of 2022. The Domestic Solid Waste Management Centre has started utilising alternative technologies to compost 100 tonnes of manure and compost per day.

Agricultural self-sufficiency is a leading priority for Qatar, as set out in the National Food Security Strategy 2018-2023. The strategy outlines thirteen initiatives across four areas including several that involve sustainability principles. These include principles around water use for agriculture optimisation, establishing an integrated food waste programme and establishing a hydroponics greenhouse cluster to reach 70% self-sufficiency on greenhouse vegetables. Self-sufficiency in many food products like meat, dairy products and vegetables has increased from 15.2% in 2014 to 28% for vegetables in 2019, while the Ministry of Municipality and Environment (MME) has targeted ambitious goals for 2023. Agriculture is an emerging industry. Its contribution to GDP has been consistently rising over the last 10 years to 0.3% in 2020), showcasing a sector ripe for adopting sustainable agriculture practices and embedding them into Qatar’s agricultural self-sufficiency ambitions.

In this section food and domestic waste have been grouped together as there is a strong relationship between the two in Qatar.

## ENVIRONMENTAL IMPACTS

For the most part, organic waste is disposed of through landfill, which uses large areas of land. Disposing of organic waste in landfills also releases methane and other pollutants into the atmosphere, which can threaten the health of people, plants and other living organisms. Methane is 28 times more potent than carbon dioxide as a greenhouse gas and landfills are responsible for around 20% of methane emissions globally. Landfills can also pollute surrounding waterbodies and soil, the latter of which also has the potential to contaminate underground water resources, collectively damaging ecosystems and creating health hazards for people living in the vicinity.

The high volume of fertilisers and pesticides used in the Qatari agricultural sector, estimated to be 112 tonnes in 2017 alone, can negatively impact the environment. Pesticides, when used extensively, can harm insects and other animals that were not the intended target, and can poison waterways. Similarly, fertilisers, which are used to promote the healthy growth of crops, can harm the environment when used in large quantities. Many minerals and chemicals which are included in fertilisers can contribute to soil depletion, impact acidity levels and saturate the soil with minerals that plants cannot process. They can also lead to the eutrophication of waterways - the process by which water becomes over enriched with minerals and nutrients, increasing the amount of plant and algae growth.

## CHALLENGES

During consultations several challenges were identified for the adoption of a circular approach across the food and domestic waste sector. One of the major challenges for Qatar, common to many GCC countries, stems from its dependence on imports, with 58% of survey respondents citing infrastructure and a lack of

alternatives as barriers to reducing food waste. As a result of Qatar’s arid and hot conditions, and the need to transport food great distances, goods in retail stores have a substantially lower shelf-life than in countries able to access fresh goods with greater ease. The lower shelf-life of food generates greater quantities of waste and contributes to a cycle of waste production as it relies on packaging as a means to extend the shelf-life of products. According to data by EcoMENA, almost half the food prepared during Ramadan is disposed of. Overall, as reflected in the consultations, inadequate education on the environmental impact of waste disposal, alongside unsuited infrastructure to accommodate waste, were presented as the most notable barriers to the circular transition in the sector,- with 54% of survey respondents identifying a lack of public education as a top barrier

## OPPORTUNITIES

During consultations, respondents proposed a range of sustainability opportunities across the food life cycle. In total, 65% of respondents suggested that by investing in innovative production and procurement technologies such as vertical farming and aquaponics, Qatar can mitigate the production of unnecessary waste and become more self-sufficient in terms of sustainable supply chains of both food and packaging. Furthermore, by promoting upskilling for new technologies and innovation, Qatar can pioneer new sustainable business models and promote low-carbon resource efficiency, with upskilling specifically cited by 24% of survey respondents.

Regenerative agriculture was proposed in the consultations to rebuild soil organic matter, restore degraded soil biodiversity and improve the water cycle. Regenerative agricultural practices – which include permaculture and organic farming, as well as conservation tillage and crop rotation, among others - aim to mimic natural processes to combine food production with environmental stewardship by enhancing the functioning of the system on which they rely. By embracing regenerative agriculture Qatar could improve the health and productivity of its farmland and wider ecosystems, as well as reduce costs. Through the adoption of agricultural practices based on outcomes, Qatar can regenerate and revitalise its soil and the wider environment, developing a system capable of producing larger quantities of high-quality food. This would increase the productivity of Qatari farms and contribute to the development of a stronger agricultural sector.

**CASE STUDY**  
**US - PLANT CHICAGO**

Plant Chicago is a US-based collaboration of food production businesses, working with the local community to cultivate a circular economy in the city. Located together in a 94,000 square foot facility, business efforts centre on promoting circularity through repurposing goods and capturing value from waste. Companies based in the Plant capture 42% of their output materials on-site and are currently working on a system to repurpose more value from production by-products. The Plant also collects food waste from nearby industries to feed into their anaerobic digester, which produces biogas that is used on-site.<sup>1</sup>

Whilst Plant Chicago has implemented efforts to improve their own waste reduction efforts, they have also targeted circularity initiatives as part of an ambition to support their local community. The Plant has provided workshops and tours for over 60,000 people and has generated direct benefits of over \$500,000 to the small business community co-located in the facility. Through introducing an education scheme, the Plant has co-ordinated field trips to educate students about the scientific and social values driving their work in the community. The Plant has also introduced a Local Circular Economy Leaders Network, demonstrating the benefits of aiding small business in collaborating on circular issues.<sup>2</sup>









1 Plant Chicago, “About the Plant”, (undated), [www.insidetheplant.com/about-the-plant](http://www.insidetheplant.com/about-the-plant).

2 UChicago, “Plant Chicago”, 2021, [chicagostudies.uchicago.edu/back-yards/back-yards-plant-chicago](http://chicagostudies.uchicago.edu/back-yards/back-yards-plant-chicago).

**POTENTIAL INTERVENTIONS IDENTIFIED**

To address excess domestic waste, Qatar could embed national pride into its sustainability efforts, including through initiatives like those reflected at Qatar Sports Day and Qatar National Day. Enhanced engagement with the public to encourage greater inclusion and a national sustainable identity would provide additional momentum for the adoption of a circular strategy across the food and domestic waste sector, as enhancing education is what many (54%) of survey respondents selected as the most feasible intervention.

To reduce domestic waste, respondents proposed introducing programmes to redistribute excess food to poorer households, expanding domestic composting infrastructure and increasing local production to prolong the shelf life of fresh goods, which 65% of survey respondents suggesting such infrastructural changes. Strengthening regulations surrounding domestic waste standards was also a prominent suggestion, cited by 40% of respondents. Another innovative proposal was capturing methane emissions from landfill and organic waste to use as a clean fuel, which in turn could generate carbon credits. Reducing food waste could therefore support Qatar to meet its Methane Pledge, reduce the volume of waste going to landfill and the cost of processing. Regenerative agriculture techniques were also proposed.

FOOD AND DOMESTIC WASTE CIRCULARITY PATHWAYS		EXISTING EFFORTS			PATHWAY RECOMMENDATION	DETAILS OF IMPLEMENTATION
		LOW	MEDIUM	HIGH		
STRATEGIC COMMITMENT		<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	Roadmap for National Food Security Strategy 2018-23	Stock-take progress since 2018 and identify roadmap to achieve targets for 2023. Embed national pride into sustainability efforts through a National Sustainable Food Day.
ECONOMIC INCENTIVES & FINANCE SUPPORT		<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	Capture methane emissions	Scale up programmes to capture methane emissions from organic waste. Establish carbon crediting systems.
DATA COLLECTION & MONITORING		<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	Data collection	Data collection on food waste at all stages in the life cycle to inform policy interventions. This would include on import, in supermarkets, and domestically.
EMBEDDING CIRCULAR PRACTICES		<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	Benchmarking	Encourage businesses to become a signatory to the PLEDGE on Food Waste. The PLEDGE is a Singapore-based global certification and benchmarking system for the food/restaurant sector. It was launched at COP27 and aims to ensure food operations send zero food waste to landfill while making cost savings.
EDUCATION & AWARENESS		<div><div></div></div>	<div><div></div></div>	<div><div></div></div>		Knowledge sharing hubs to build awareness of the challenges around waste food.  Encourage initiatives to support the donation of waste food to vulnerable people.  Include organic food waste collection as part of the waste management strategy with an accompanying community awareness campaign.
RESEARCH AND INNOVATION		<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	Create/invest in a Qatar ‘innovative agriculture and food’ fund	Create a research and innovation fund (including upskilling) for innovative food and farming technologies to signal a move to Qatar becoming a leader across the region for developing sustainable food production systems for hot, arid environments
OPTIMIZING CONSUMPTION STRATEGIES		<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	Campaign to promote pride in Qatar grown food	Make progress towards aims in Qatar’s Food Security Strategy by advertising and encouraging the purchase of Qatar-grown food to reduce carbon emissions and food waste associated with imports.
PUBLIC PROCUREMENT & GREEN SUPPLY CHAIN		<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	Regulated procurement	Regulate government and private procurement to ensure that there are sustainable supply chains for food.
URBAN PLANNING & ASSET MANAGEMENT		<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	Organic waste composting facilities	Expand the infrastructure for composting of organic materials. Household recycling bins required as well as industrial composting facilities which could also be used or biogas-based electricity production.

# The built environment



With a reputation of negative impact comes a huge responsibility to change”

## CONTEXT

The FIFA World Cup 2022 has created a legacy of sustainability for Qatar which will shift the dial on the way that future FIFA World Cups and other sporting events are organised. It is a prime example of how Qatar can use sustainability to increase its standing on the global platform. Qatar has strived to create a carbon neutral mega event through diverting 70-80% of waste from construction, reusing shipping containers to build stadiums, utilising materials from demolished buildings in constructing new stadiums and making plans for deconstruction and repurposing of building materials after the cup. Remaining emissions are being offset.

After mining and extraction, construction represents the second highest proportion of GDP (13%) and it is expected to grow 10% per year, making it an integral part of the economy. Qatar has the potential to emerge as a leader on sustainability in the MENA region through building on the World Cup legacy and on other sustainable developments such as Lusail City and Msheireb Downtown. Msheireb boasts the world's largest collection of Leadership in Energy and Environmental Design (LEED) buildings. LEED sets out a rating system for the design, construction, operation, and maintenance of green buildings, homes, and neighbourhoods, which aims to help building owners and operators be environmentally responsible and use resources efficiently.

Qatar has introduced a range of policies and regulations to improve the sustainability of buildings. In 2005, enhanced environmental regulations were introduced which mandated that new projects must gain environmental clearance from the Supreme Council for Environment and National Reserves and conduct an environmental impact assessment. Qatar has also developed its own green building rating system, the Global Sustainability Assessment System (GSAS). The system aims to minimise the ecological impact of construction and to preserve the traditions and identity of the region. Major government projects in Qatar increasingly seek to ensure new projects are either GSAS or LEED certified.

The 2018 to 2022 National Development Strategy (NDS), reaffirmed Qatar's commitment to developing a comprehensive urban development plan and a sustainable urbanisation policy. As well as introducing legislation and standards, Qatar has made strides towards improving knowledge sharing through the establishment of the Qatar Green Building Council in 2009 with a mandate to promote sustainable development in Qatar using cost efficient and environmentally friendly building practices. The Council has worked closely with the local community and construction industry to support Qatar's transition to a climate-neutral, knowledge-based economy. In 2022, the Council expanded its remit to broader sustainability issues and became Earthna. Knowledge sharing has also been encouraged through the Supreme Committee for Delivery and Legacy in Qatar and Gulf Organisation for research and development with the release of a 2022 report which aims to share best practice on efficient waste management strategies across the construction sector.

## ENVIRONMENTAL IMPACT

In Qatar, the construction and manufacturing sector are responsible for around 16.8% of Qatar's emissions (19.22MtCO<sub>2</sub>e in 2019), with emissions from the built environment sector estimated to be 0.4% of Qatar's emissions (420ktCO<sub>2</sub>e). However, manufacturing includes other activities unrelated to construction. The household sector uses a significant proportion of electricity generated (approximately 59%) when compared to other sectors such as industry (29%). By comparison, in the UK households use around 37% of end-use electricity. Most of the emissions from the operation of buildings come from the cooling requirements and water treatment. Emissions from construction are partially due to the emission intensive nature of some key materials used in construction, such as cement, which can produce 1tCO<sub>2</sub>e for every tonne of cement produced.

As well as emissions, damage to ecosystems can occur particularly when construction sites are built in areas that were not already urbanised. Air pollution can occur during all phases of a building's life cycle. Land clearing, engine operation, and usage of toxic chemicals can contribute to air pollution during the construction phase. During this phase, high levels of microscopic particles of dust can be released into the air and transported across large distances, with the potential to contaminate other areas as well. The diesel engine exhausts of vehicles and heavy equipment are also highly polluting.

Construction sites can cause water pollution, which can be the result of both manmade hazardous chemicals released during the construction of a building and following the dismantling of a building or complex. The clearing of land may trigger soil erosion and produce high levels of sediment. When this sediment reaches natural waterways, it can harm aquatic life by restricting necessary sunlight. Pollutants carried away from construction systems by water have the potential to poison animals and vegetation and may reach human food chains by soaking into the groundwater.

Another cause of environmental pollution linked to buildings stems from the large quantities of waste that construction sites produce. Waste from the construction sector accounted for 79.2% of total solid waste generated in Qatar in 2012. As a result of the increase in projects in the lead-up to the 2022 FIFA World Cup, the NDS 2018-2022 estimated that this sector produced 0.9-10.8 million tonnes of demolition debris per year. The 2011-2016 NDS set a target to ensure that at least 20% of materials used for construction were from recycled sources by 2022. Whilst construction waste has fallen in recent years, it is still the highest waste generation activity in the country.

CHALLENGES

During consultations, a number of challenges were identified. One significant challenge identified was the ‘siloing’ of policy areas, and 30% of respondents made the point that rather than prioritise coherent national planning, most advancements in Qatar have been reached through isolated projects. Despite the adoption of infrastructure legislation and multiple municipal development plans, interventions often fall short on wide-reaching, policy backed measures. As suggested in the NDS 2018-2022, one of the causes of the low level of recycling of construction waste aggregate is due to the absence of a law which obliges foreign companies to purchase a certain percentage of construction raw materials, such as recycled aggregate from the Qatari domestic market.

Whilst significant achievements have been made around the sustainability of large-scale projects, such as the FIFA World Cup, the same ambition does not stretch across the entire sector, with sustainability being less emphasised during the planning and realisation phase of smaller-scale projects. An important challenge raised by 21% of respondents was the absence of regulation. Since there are no specific sustainability requirements for many small-scale projects, builders often focus on “cutting costs”, rather than on the quality or sustainability of their work. As a result, buildings are not built to last, with competition favouring low-cost projects over those made using more expensive (though not if using recycled aggregate), sustainable materials. Furthermore, the lack of strong regulation hinders enforcement, as acknowledged by 40% of respondents, making it more complicated for authorities to monitor the potential toxicity of the materials used, their disposal, and the emissions generated through their production and use.

Closely connected to the absence of strict regulation are the low levels of transparency and the absence of data. One of the main challenges for the adoption of a comprehensive circular economy strategy for buildings in Qatar stems from the lack of publicly available data on emissions and environmental impacts. The life cycles of buildings face different but interconnected challenges, from the manufacturing of building materials, the construction stage, the energy used in running the building, transport and waste disposal systems. Exacerbated by a lack of data and transparency were concerns around greenwashing. Specifically, in the consultations, greenwashing was cited as a barrier to supporting educated, sustainability-minded choices, as market participants generally lack the technical knowledge on sustainable practices to decipher between truly green infrastructure and that which is falsely marketed as sustainable to attract ESG-minded customers and investment. As such, a strictly data-based approach to policy in the built environment is essential to transform the industry into a circular system that is both economically and environmentally sustainable, and which can confidently circumvent greenwashing.

Also identified in the consultations were a lack of incentives to improve the efficiency in the use of buildings with Qatari citizens receiving government subsidies to cover the costs of electricity and water. Challenges around labour shortages and sustainable building skills were also raised as barriers.

OPPORTUNITIES

Through the consultations, a number of opportunities were identified for improving the circularity of buildings. Reducing energy use in buildings not only increases the availability of energy resources available for export, but it also promotes economic growth through investment and job creation. Retrofitted buildings can reduce heating and cooling energy requirements by 50-90%, whilst new, energy-efficient buildings often use close to zero energy for heating and cooling. Qatar has the opportunity to build on its expertise from the development of green cities and the repurposing of developments such as the FIFA World Cup to take on a leadership role in the sustainable built environment sector. This could also lead to further domestic and foreign investment in Qatari innovation and research and development.

Embracing circular economy principles in the built environment would also improve the overall living conditions of Qatari citizens. The construction of sustainable and energy-efficient buildings in particular can help citizens to overcome some of the challenges presented by the extremely arid and hot climate. Greater innovation in the built environment would also enable the adoption of innovative technologies such as low-energy intensive cooling and water production systems.

Respondents raised the value of construction waste including its potential uses of aggregate for building roads, masonry blocks and aggregates for concrete. Trials over the past five years by the Qatar Foundation show promise for construction waste recycling in Qatar, particularly considering the country’s current reliance on imports of aggregates and high levels of construction waste. The study has found that recycled aggregate consumes 50-75% less energy and costs 50% less than imported aggregate, and has the further benefits of fewer landfill sites and a reduced carbon footprint that come with cutting down on imports. The study led to the development of the first Qatar standards on recycling and an update of the Qatar Construction Specifications. It was also later adopted as the first Gulf Cooperation Council (GCC) Standardisation Organisation for recycling, an important signal to the market. It is estimated that locally produced recycled aggregate can replace 100% virgin aggregate for use in non-structural applications, and up to 50% in structural applications initially. This is expected to increase as the industry becomes more familiar with using recycled aggregate.

A further opportunity in the context of the built environment is an urban-based ‘circular metabolism’ framework. According to the responses from the consultations, adopting a holistic ‘circular metabolism’ framework (which encourages urban developers and governments to study, design, and manage sustainable cities) for the sector would ensure that it benefits from higher efficiency during the production and usage of resources, including water, food and energy. This ensures that embracing circularity within the built environment presents wider cross-cutting benefits across the urban ecosystem.

POTENTIAL INTERVENTIONS IDENTIFIED

As most emissions during a building’s life cycle come from the use of them rather than through construction, initiatives to improve household behaviour and the efficiency of buildings were identified as a priority. Green renovations and sustainable building standards would have a significant impact on not only the emissions from buildings but would also reduce heating and cooling energy requirements across the country.

Consultations proposed several interventions to shift behaviours, with 24% of respondents identifying tax incentives and fines for violations, 17% identifying investment in innovative green technologies and building materials as well as suggestions to improve metering for water and electricity usage.

In total, 24% of respondents called for more regulation to improve transparency and 59% called for mandatory standards such as the Energy Performance Certificate (EPC) regulation; a regulation to increase the use of recycled domestic construction products, and better coordinated national planning to prevent rushed construction. Finally, 54% of respondents proposed changes to procurement practices both in the government and private sector including looking at “best value propositions”.

CASE STUDY  
UK - GREENING GOVERNMENT  
COMMITMENTS

First established in 2011, the UK’s Greening Government Commitments (GGCs) set targets for UK government departments and their agencies to reduce their environmental impact and improve their environmental performance over five-year cycles. The 2016 to 2020 GGCs, for instance, set out targets for government to reduce greenhouse gas emissions by 43%, domestic flights, waste, paper consumption and water use, compared to a 2009 to 2010 baseline. Each year UK government departments must also demonstrate how they ensure the goods and services procured are as sustainable as possible, and report transparently on their actions on climate change adaptation, biodiversity, sustainable food and catering, sustainable construction, and any other significant elements of their work which could negatively impact the environment.<sup>2</sup>

The targets recognise that departments carry out a wide variety of functions and activities and as such are designed to allow flexibility. Each year all departments are required to report on the progress they have made in achieving the targets compared to a set baseline. All departments are responsible for the collection, processing and quality of their own data.

The legislation has been highly successful, and the government was able to reduce emissions by 50% in the 2019-2020 year compared to the baseline. Sustainable procurement training has been adopted by many departments as a means of embracing sustainable procurement across government supply chains, and many of them carry out reviews of their suppliers, with the aim of evaluating and learning from their sustainable procurement activities and continuing to improve practices.

UK Government, “Greening Government Commitments”, 2021. Greening Government Commitments - GOV.UK (www.gov.uk).

THE BUILT ENVIRONMENT CIRCULARITY PATHWAYS		EXISTING EFFORTS			PATHWAY RECOMMENDATION	DETAILS OF IMPLEMENTATION
		LOW	MEDIUM	HIGH		
STRATEGIC COMMITMENT					Sustainable buildings strategy	A strategy setting out the governments approach to improving circularity and sustainability from construction to decommissioning of buildings and key performance indicators
ECONOMIC INCENTIVES & FINANCE SUPPORT					Tax incentives for local products	Introduce tax incentives for the use of local recycled aggregate and other materials. A regulation to phase in locally produced recycled aggregate over 10-15 years to allow development of production to recycle at the necessary scale.
DATA COLLECTION & MONITORING					Life cycle analysis data base	Creation of a life cycle analysis data base on the environmental impacts of the built environment sector to understand where best to target policy interventions.
EMBEDDING CIRCULAR PRACTICES					Construction Products Regulation	Regulation to introduce unified standards for each product within the construction sector including on environmental and safety.
EDUCATION & AWARENESS					Energy Performance Certificate (EPC) regulation	A regulation requiring all buildings in Qatar to measure their energy efficiency levels to determine where efficiencies can be made. Should be stored on a central database which would be publicly available. Introduced alongside upskilling for the retrofitting of energy efficiency measures in buildings.
RESEARCH AND INNOVATION					Scale up of recycled aggregate from structural and non-structural applications	Co-developed with recycled aggregate regulation -upskilling and training, and investment in aggregate recycling facilities to meet increased demand.
OPTIMIZING CONSUMPTION STRATEGIES					Behaviour shift	Data collection, reporting and benchmarking by KAHRAMAA to inform education and awareness around sustainability to shift consumer behaviours e.g., closing doors when the air conditioning is on.
PUBLIC PROCUREMENT & GREEN SUPPLY CHAIN					Regulation for sustainable government procurement standards	The government, as a large property owner, can transform building standards through setting minimum sustainability standards for all its rented and owned buildings.
URBAN PLANNING & ASSET MANAGEMENT					Mandatory Global Sustainability Assessment System (GSAS) 'Design and Build' certification for all new buildings	Regulation that mandates all new buildings in Qatar gain the GSAS 'Design and Build' certification to ensure new buildings have embedded sustainability into their design, covering areas including: urban connectivity, site, energy, water, materials, indoor environment, cultural and economic value, and management and operations.



# Energy Transition & Renewables



Energy represents the lifeblood of all aspects of technology that man has reached. Its weakness or absence reverts us many decades back in time.”

## CONTEXT

The energy transition, including a move towards more renewable energy sources, is a global priority with significant momentum behind it. The COP27 climate conference in Egypt in 2022 established a work programme for a Just Transition and mandated annual ministerial round tables. A Just Transition seeks to ensure that the benefits of a green economy transition are shared widely whilst supporting those that stand to lose economically. The G7 have launched a series of Just Energy Transition Partnerships (JETP) starting with South Africa at COP26 where they committed to mobilise \$8.5bn to transition towards a low carbon economy. At COP27 a JETP was launched in Indonesia with a commitment to mobilise \$20bn to support a transition.

Qatar’s economy has grown rapidly due to the extraction of natural resources. The energy sector accounts for 28% of Qatar’s GDP, making it vulnerable to international price fluctuations. Qatar is the largest exporter of liquefied natural gas (LNG) in the world, possessing the third largest known reserves of natural gas globally after Russia and Iran. In recognition of this, the Qatari National Vision (QNV) 2030 stressed the importance of scaling up the non-hydrocarbon sector.

Qatar’s decision to expand LNG output has positioned it as a key strategic partner for European energy security. Qatar has developed a reputation as a highly reliable energy supplier that keeps geopolitics apart from its supply commitments. During the 2017-21 Gulf crisis, Qatar maintained gas supplies to the United Arab Emirates via the Dolphin Pipeline despite a challenging geopolitical climate. The global energy crisis has given Qatar new prominence as a source of energy. Qatar is now in a position of strategic leverage in the LNG market, as Europe scrambles to replace Russian pipeline gas supply and Asia looks to stay ahead of the spike in European demand.

Building on this growth by promoting an efficient economic and technical use of natural resources, while realising the benefits of decarbonisation, creates a significant opportunity for Qatar to drive the next phase of the energy transition. Globally, political momentum has risen over the past few years to accelerate decarbonisation, particularly following COP26, with 90% of the world’s economy now covered by net zero targets. Domestic challenges, such as increasing groundwater salinity, air pollution and demand

for electricity and water, which doubled between 2007 and 2017 due in part to population rise, have combined to create an inflexion point for Qatar’s energy transition. In 2022 Qatar Energy (formerly known as Qatar Petroleum), the state-owned company responsible for operating all oil and gas activities, published its updated Sustainability Strategy which proposes to develop a Low Carbon Energy Department with the mandate of reducing emissions whilst preserving the country’s LNG sector. Targets within the strategy include fixing methane intensity at 0.2% by 2025 and a carbon reduction intensity of 15% from upstream and 25% from the LNG facilities by 2030. Qatar is a signatory of both the Methane Pledge to contribute to a collective effort to reduce global methane emissions at least 30% from 2020 levels by 2030, and the Methane Guiding Principles which drive efforts to reduce methane emissions from natural gas.

There have already been positive signs of progress on carbon capture and storage (CCS) in Qatar. Looking ahead, utilising the potential of carbon capture, particularly for “hard to abate” sectors, presents Qatar with a significant opportunity to strengthen its credentials as a global decarbonisation leader. It has set ambitious goals to expand the use of carbon capture and sequestration technology to capture more than 11Mt CO2 annually in Qatar by 2035. CCS is also being included in the development of a new LNG facility.

The renewables sector has also been expanded and Qatar aims to meet 20% of the country’s energy demand from renewable sources by 2030. In October 2022 Qatar, in partnership with TotalEnergies, opened its first large scale solar power plant – Al Kharsaah - which covers 10km2 and includes more than 1.8 million solar panels. The facility has a capacity to meet 10% of Qatar’s peak electricity demand. A further development has been agreed between Qatar Energy and Samsung C&T (South Korea) to install 875 MW of solar power capacity at Ras Laffan and Mesaieed, planned to be operational in 2024. Qatar has introduced a number of measures to improve efficiency in its energy sector including Qatar Energy’s zero routine flaring by 2030 target.

Although Qatar has made significant progress to expand renewables it lags behind its peers across the MENA region

in the race to decarbonise. As of the end of 2021, Qatar had a capacity of 43MW from renewable energy sources – namely solar and biogas . This puts Qatar significantly behind Kuwait (106 MW), Oman (188 MW), Saudi Arabia (443 MW) and the United Arab Emirates (2706 MW).

**ENVIRONMENTAL IMPACT**

Energy production, including from renewable sources, can have significant environmental impacts. The energy sector in Qatar is responsible for 98% of Qatar’s GHG emissions. As well as being a considerable source of emissions, energy production and fossil fuel transportation can have a number of negative impacts on the environment. Oil spills can result in the death of seabirds, fish and marine animals. Air pollution, to which refinery processes are a contributor, is responsible for the deaths of circa 250 people a year in Qatar. Qatar’s Ministry of Public Health has most recently implemented efforts to enhance environmental health risk monitoring and regulation, recognising the scale of the challenge whilst improving data collection and monitoring major risk factors for morbidity.

Both solar and wind energy technologies present challenges in terms of waste, with both wind turbines and solar panels being complex to recycle. The resin-coated fibre-glass in turbine blades is particularly difficult to recycle, leading to most blades globally ending up in landfills. Similarly, whilst the life expectancy of solar panels is high, currently around 25 to 30 years, which can help to limit waste, in many countries the components they are made of are not widely recycled. Globally, it is expected that by 2050 PV waste will reach 5 - 5.6 million tonnes.

**CHALLENGES**

During consultations a number of challenges for the energy transition and renewables were identified. Consultations identified the absence of a long-term target for decarbonisation and a post-2030 plan from Qatar Energy as a key challenge, with 29% of respondents referring to a general short-termism with regard to policymaking. In order to develop a stable regulatory framework that can boost investor confidence and attract inward investment, a long-term decarbonisation strategy should be prioritised. Industries traditionally connected to or reliant on hydrocarbons, such as the iron and steel, oil and gas, chemical and petrochemical sectors, also face significant policy uncertainty as a result of the changing domestic and international policy landscape. For both renewables and the transition there were also concerns about join-up between research institutes and industry with a lack of knowledge sharing (12% respondents) also exacerbating information gaps (21% respondents). General data gaps were also raised as significant challenges by 9% of respondents.

On renewables, feedback suggests that the disconnect between academic institutions and the industrial sector was a particular challenge. This has meant that research groups have not focused on solutions to the specific issues faced by Qatari manufacturers. According to respondents to the consultations this ‘research collaboration gap’

is further compounded by the lack of resources and development funding. Another challenge is that innovation has not been prioritised by researchers in the industrial ecosystem. Only by focusing on innovation can the Qatari labour market make the most of its human capital, with 11% of respondents pointing specifically toward skills gaps. 26% also argued that inadequate education on the impacts of their behaviour on the environment was also one of the biggest challenges. The size of Qatar’s domestic market also presents a challenge as it makes it more difficult for Qatar to take the lead on innovation and may, instead, remain behind “mature” markets such as Saudi Arabia or the UAE, or even outside the Gulf region itself.

**OPPORTUNITIES**

Qatar has the opportunity to capitalise on the current global momentum to deliver a just transition. Billions of dollars of public and private sector investment are being mobilised to support emerging markets to transition. By pivoting away from hydrocarbons and embracing new technologies such as low-carbon hydrogen, ammonia, and CCS, Qatar has the opportunity to become a global decarbonisation leader while diversifying and strengthening its economy. By piloting and scaling up these innovative technologies for the rest of the world, Qatar can take a leading position in driving climate change mitigation and, at the same time, develop new industries with high economic growth potential. Qatar can also take the lead in making the LNG industry low-carbon and, therefore, more sustainable. This would prolong demand for fossil hydrocarbons in a net zero world. This can be done by significantly reducing the methane emissions associated with the production, transportation and liquefaction of natural gas. Qatar’s choice to include CCS technologies in new LNG facilities is a step in this direction. A good example of this is the Al-Shaheen Oil Field Gas Recovery and Utilisation Project which has been registered as a Clean Development Mechanism project, estimated to abate ~2.5Mt CO2 per year.

By scaling up the production of renewable energy and decreasing the domestic reliance on gas, Qatar can optimise the profits from its gas sector. As highlighted in the Qatari 2018 – 2022 NDS, soaring prices of oil and gas exports have contributed to Qatar’s wealth. In light of the ongoing energy crisis and the increasingly high prices of gas, Qatar has the opportunity to enhance one of its main sources of revenue though decreasing its domestic use.

Qatar is geographically well-positioned to develop solar energy, with an average daily sunshine of around 9.5 hours. It also has a direct irradiance of around 2MWh per m2 per year. This means it has particularly high potential for concentrated solar power, which could be effectively used for powering industrial scale desalination plants. Embracing solar could provide Qatar with increased energy security, employment opportunities, improved air quality and reduced GHG emissions.

**CASE STUDY:  
ARGENTINA - TRANSITION TOWARDS  
DECARBONISATION**

Currently, Argentina’s primary energy mix is dominated by natural gas and oil, with the country housing the 2nd largest reserve of shale gas and the 4th largest reserve of shale oil worldwide.

To transition from this, Argentina has recently approved its ‘Guidelines for an Energy Transition Plan to 2030’ which calls for a structural change in the nation’s systems of supply and energy use.<sup>1</sup> The plan entails two broad scenarios for the supply of electricity by 2030 with one targeted at meeting a 20% share of renewable energy in the generation mix and the second to reach a 30% share. Both scenarios are based on the country’s diversification of its energy and investment in renewables such as wind and solar power. To support the change in generation mix, substantial investments are planned in electricity transmission ranging from \$9.9bn to \$14bn until 2030, depending on the scenario. As a result of Argentina’s transition plan, the measures intend to result in a structural change in energy supply and usage systems, seizing upon the country’s macroeconomic and social context to drive forward decarbonisation. In particular, the plan guarantees equitable access to high quality energy, whilst maintaining economic profitability and achieving self-sufficiency in supplies through LNG. Further working to promote regional capacity-building and energy diversification, Argentina will also develop a new hydrogen national strategy and has committed for more than 90% of increased installed power between 2022 to 2030 to come from low-emission energy sources, reducing emissions by 50%.

1 Government of Argentina, “Lineamientos para un Plan de Transición Energética al 2030”, 2021, [www.argentina.gob.ar/sites/default/files/infoleg/res1036.pdf](http://www.argentina.gob.ar/sites/default/files/infoleg/res1036.pdf)










**POTENTIAL INTERVENTIONS IDENTIFIED**

During consultations the main priority identified by stakeholders was for the government to set out a long-term transition plan to a low carbon economy. In the short-term this would also provide continued certainty for investors around the viability of LNG investments in Qatar, as it will give greater transparency on Qatar’s approach and timelines for significant milestones.

Improved access to data was raised as a priority, with Qatar’s commitment to the Methane Principles a positive step towards that. Respondents called for increased incentives for companies to embrace renewables, which could take the form of subsidies for green companies (26% of respondents), subsidies for sustainable equipment (17% of respondents), and carbon markets (38% of respondents). The consultations also discussed improved funding for small-scale pilot projects which focus on repurposing materials across different sectors and the potential utility of green and sustainable public procurement practices (23% of respondents). One respondent in the survey highlighted as an example a project by Qatar Energy which focuses on re-using waste crude oil as a raw material for the production of cement. Therefore, not only are there opportunities for collaborative action in Qatar for driving a positive impact, but there is also a strong potential for cross-cutting circularity initiatives across the energy and other sectors, including construction and the built environment.

The consultations identified highly impactful measures including greater investment in technology and innovation (39% respondents); the introduction of new regulations on sustainable standards (30% of respondents); and government led stakeholder forums (11% of respondents). Information campaigns with the general public (30% of respondents) and staff training on sustainable best practices (14% of respondents) were also considered measures with a high impact potential.

Finally, respondents to the consultations also considered measures which address the sustainability of consumer behaviour through taxes or fines (26% of respondents) as potentially impactful. They also identified greater transparency on the sustainability and environmental credentials of products as impactful measures (18% of respondents).

ENERGY TRANSITION & RENEWABLES CIRCULARITY PATHWAYS		EXISTING EFFORTS			PATHWAY RECOMMENDATION	DETAILS OF IMPLEMENTATION
		LOW	MEDIUM	HIGH		
STRATEGIC COMMITMENT		<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>	Long term energy transition strategy	A long-term strategic plan is needed for Qatar's transition to a low-carbon economy to provide certainty around both LNG and renewable investments.
ECONOMIC INCENTIVES & FINANCE SUPPORT		<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>	Incentives for renewables	<p>Introduce a Contracts for Difference scheme in Qatar. In the UK, Contracts for Difference incentivise investment in renewable energy by providing developers of projects with high upfront costs and long lifetimes with direct protection from volatile wholesale prices, and they protect consumers from paying increased support costs when electricity prices are high. Developers of renewable projects are paid a flat (indexed) rate for the electricity they produce over a 15-year period; the difference between the 'strike price' (a price for electricity reflecting the cost of investing in a particular low carbon technology) and the 'reference price' (a measure of the average market price for electricity in the market).</p> <p>Introduce Solar Renewable Energy credits (SREC) and/or Feed in Tariff (FIT) towards national solar power target of 5GW by 2035 for residential and commercial settings. A SREC model would support solar power contributions to the national solar power target. Energy generation from solar power in each building would be measured and SRECs would be used as "proof of generation" for one megawatt-hour (MWh) of solar electricity. Possible integration of a Feed in Tariff similar to the UK whereby solar panel owners register with Qatar Electricity and Water and receive payments (at least quarterly) for the electricity their installations generate. These payments would be based on meter readings so would need to be supported by a nationwide metering system.</p>
DATA COLLECTION & MONITORING		<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>	Monitoring of fossil fuel and renewable derived energy generation	To be conducted nationally, per sector of the economy and disaggregated into commercial and domestic use to allow targeted policy creation.
EMBEDDING CIRCULAR PRACTICES		<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>	Carbon pricing systems	Carbon pricing systems are increasingly ubiquitous in the international policy landscape. This is in part due to the operationalisation of carbon markets under the Paris Agreement and the growth of international compliance markets. The EU's carbon border adjustment mechanism introduces a carbon tax on imports. The introduction of a Qatari carbon pricing system could support the transition to a low carbon economy, create new revenue streams and support Qatar to enter new markets through setting a national carbon price.
EDUCATION & AWARENESS		<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>	Nationwide campaign for solar tax credit uptake	Encouraging residential and commercial solar generation and ensuring the population are aware of available policy incentives.
RESEARCH AND INNOVATION		<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>	Investment in innovative technologies	Qatar could position itself as a hub for a sustainable hydrocarbon industry through research and innovation into CCS and other technologies such as solar technologies adapted to arid conditions. This creates new sources of income and prolongs demand for Qatar's resources.
OPTIMIZING CONSUMPTION STRATEGIES		<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>	National data collection for water and electricity	Metering of water and electricity usage by all businesses, collected by Qatar Energy and Water – used to assess high usage areas and target interventions for reductions.
PUBLIC PROCUREMENT & GREEN SUPPLY CHAIN		<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>	Government commitment to procure low carbon electricity	Government commitments to procure renewable only electricity for government owned assets and buildings.
URBAN PLANNING & ASSET MANAGEMENT		<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>	Private sector partnerships	In order to achieve all its renewable energy targets, Qatar should continue to invest in the development of solar power plants, green hydrogen, and CCS. It should also engage in urban planning that reduces energy demand and the urban heat island effect. Additionally, Qatar should also set up new partnerships with private sector organisations for the enhancement of sustainable energy practices.

# Chapter 3

## Next Steps



This report is the first stage in a programme of work to develop data-driven policy recommendations that can support Qatar to diversify and build a sustainable, circular economy for future generations. This report builds on the outcomes from series of workshops and a survey to engage policy makers, professionals and civil society within Qatar and reflects their views on the opportunities from moving to a circular economy and challenges in achieving that transition. The consultations also provided a range of qualitative data on the interventions already being taken by businesses and the government, as well as proposing solutions and new potential interventions.

The initial consultations focused on six sectors: hospitality, water, energy transition and renewables, plastics including fashion and packaging, the built environment, and food and domestic waste.

The next stage of work will be to develop an Issues Paper which will be launched at the Qatar Foundation Earthna Summit in March 2023. The paper will focus on the construction, hospitality, and food and domestic waste sectors. It will explore:

- The economic case for moving toward a circular economy. Although the economic case for moving toward a circular economy has been made in Europe, little work has been done on this in Qatar or the MENA region. In the next phase of work, it will be important to establish the economic and ethical justification for moving to a circular economy. Providing these arguments will support policy makers to understand the broad economic and ethical benefits that circularity delivers.
- An impact assessment of the circularity pathways identified in this report. At a sectoral level the report has identified potential pathways to a circular economy based on feedback from consultations and international approaches. The Issues Paper will explore further which of these pathways has the highest potential to realise circular economy benefits in the Qatari context.
- Policy recommendations. Through interviews with ministries, additional surveys and analysis of the most impactful circular pathway the Issues Paper will set out data-driven, context specific policy recommendations that align with Qatari cultural values and priorities.
- An analysis of data gaps and recommendations on how to fill them to inform future work. The report will set out the methodologies and assumptions for a life cycle assessment economic modelling and other analysis and assess the benefits and limitations of such methodologies.

# Annex 1:

## Data and Challenges

A challenge observed during consultations and the development of this report was the accessibility of reliable recent data. This report has focused on publicly available data on emissions, GDP and the environmental impact of each sector. Across all these areas there was a lag in data availability. For example, for GDP there is data available from as recent as 2021. However, for emissions, the last emissions inventory submission to the UNFCCC was in 2007. Where data was available in these areas they are often presented as headline figures, without information on the scope, conversion factors or assumptions that have been made. Where sectoral data was available, no breakdown was found of which activities were included in their scope. Different databases also split sectoral activities differently. For example, the UNFCCC inventory from 2007 provides emissions broken down by sectors including energy, industrial processes and agriculture, whereas the National Development Strategy takes a different approach, including waste, the marine environment and industries. Data for the sectors also varied between sources with significant discrepancies in some cases. This is likely due in part to variations in how activities were grouped into sectors in different databases. This has made it difficult to ensure that datasets take a consistent approach between or within the sectors of focus. However, to ensure consistency in our approaches, we have aimed to take a consistent approach where possible, through selecting the most relevant and applicable statistics from different groupings of data.

### EMISSIONS

No Qatari sources were available for emissions. Sources on emissions data often lacked granularity on the activities covered by the sector and the emissions conversion factors used. Figures often only covered select sectors rather than providing a breakdown of the whole economy, making it difficult to use consistent data for comparisons between sectors.

SECTOR	EMISSIONS	SOURCE	ASSUMPTIONS AND CAVEATS
THE BUILT ENVIRONMENT	2019: Manufacturing and Construction = 19.22MtCO2e	Our World in Data – Qatar CO2 Country Profile	Data on the construction industry is combined with emissions of manufacturing industry.
	2019: Buildings= 420ktCO2e		
FOOD AND DOMESTIC WASTE	2019: Waste: 1.3MtCO2e  2019 Agriculture: 610ktCO2e	Our World in Data – Qatar CO2 Country Profile	The source does not specify which types of waste are included within waste category. It does not differentiate between commercial and domestic waste.
WATER	2019: Water and Electricity for domestic sector contributed to 18.7MtCO2e	Qatar National Emission Inventory Report	Data on emissions from water are combined with emissions from electricity meaning exact emissions from the water sector are unclear.
ENERGY	2020: Energy: 84.13MtCO2	International Energy Agency	Data is calculated in CO2 emissions rather than CO2 equivalent so this may not be representative of the energy sector’s full impact as it does not include other greenhouse gasses such as methane.
PLASTICS, FASHION AND PACKAGING	Unknown	n/a	n/a
HOSPITALITY	2022: Hotels: 1.3MtCO2e	2021 Cornell Hotel Sustainability Benchmarking Index	Data is from 2019 statistics on hotel room carbon emissions.  Statistics on hotel room numbers are based on projected figures for 2022.

ENVIRONMENTAL IMPACTS

There was no quantitative data available on the environmental impacts such as on biodiversity, chemical leeching and air pollution from each sector in Qatar. Qualitative sources of information were used instead.

SECTOR	IMPACT	SOURCE	ASSUMPTIONS AND CAVEATS
THE BUILT ENVIRONMENT	Air Pollution	Sustainable Build	UK-based research, findings reflect broader impacts of pollution that are relevant to Qatar.
	Wastewater Pollution	Sustainable Build	UK-based research, findings reflect broader impacts of pollution that are relevant to Qatar.
	Chemical Pollution	Sustainable Build Willmott Dixon	UK-based research, findings reflect broader impacts of pollution. Research by Willmott Dixon is UK-centred. Despite this not being specific to the Qatari context, it outlines the implications of chemical pollution on the environment and workers.
FOOD & DOMESTIC WASTE	Habitat Destruction	Imperial College London World Wildlife Foundation (WWF) The Ocean Blue Project	Data is primarily based on Australian marine research and the impact of plastic pollution on sea turtles and seabirds. The assumption is made that plastic waste is a universal problem, especially pertinent given Qatar's rich marine biodiversity.
	Soil Pollution	Qatar Planning and Statistics Authority	Data is drawn from Qatar's latest set of 2022 Environmental Statistics.
	Water Contamination	Mariyam, S, Cochrane, L et al. (2022). 'Waste Management in Qatar'. Sustainability.	Research is relevant to the Qatari context, with levels of waste based on findings within the MENA region.
	Plastic Pollution	Imperial College London WRAP	UK-based, statistics reflect the global scale of plastic waste.
	Chemical Pollution	Health Protection Agency	Whilst research is not specific to Qatari context, given how much of Qatar's waste goes into landfill, chemical leaching is assumed to be a highly relevant challenge.
	Eutrophication from use of fertilisers	Qatar Planning and Statistics Authority	Research is not specific to the Qatari context. However, the environmental impacts of fertilizer usage are a global challenge.
WATER	Loss of Marine Habitats	Torquemada-Fernandez, Y, Sanchez-Lizaso, J. (2019). Impact of bring on the marine environment and how it can be reduced'. Environmental Science, Engineering.	Research is not specific to the Qatari context, with findings from Spain. However, given the extent of brine production in Qatar as a result of desalination, it is assumed that increase water salinity has an effect of marine ecosystems and that these findings are of relevance.
	Increased Water Salinity from excess brine production	Fanack Water Abdulrahman S. Alsharhan, Zeinelabidin E. Rizk. (2020). Water Desalination: Environmental Impacts and Brine Management. World Water Resources.	The data is relevant to the Qatari context, as the data is rooted in both country-specific and UAE-based studies. The research highlights the adverse effects of brine on groundwater, a problem also relevant to Qatar due to its high prevalence of desalination plants.

SECTOR	IMPACT	SOURCE	ASSUMPTIONS AND CAVEATS
ENERGY	Chemical Pollution	Mariyam, S, Cochrane, L et al. (2022). 'Waste Management in Qatar'. Sustainability.	Research is relevant to the Qatari context, with levels of waste based on findings within the MENA region.
	Waste from unrecyclable renewables	Energy Observer	The research is global in scope and solar panel waste is highly relevant to Qatar given its growing and significant role in the country's energy mix.
	Air Pollution	Our World in Data	Data on air pollution and emissions is specific to the Qatari context.
	Ocean Acidification	US Environmental Protection Agency (EPA)	Research was published by the US Government's EPA and is not specific to the Qatari context. However, through outlining the broader impacts of acidification including its threat to human economies, these findings are of global relevance including to Qatar.
PLASTICS, FASHION AND PACKAGING	Plastics pollution	Henry, B and Kautaka, K. (2019). Microfibres from apparel and home textiles: Prospects for including microplastics in environmental sustainability assessment. Science of the total Environment.	A wide-ranging study that assesses the impact of microfibre accumulation on the environment over a global scale. As a result, findings are of relevance to Qatar especially in light of the country's high waste generation rate.
	Chemicals pollution	Henry, B and Kautaka, K. (2019). Microfibres from apparel and home textiles: Prospects for including microplastics in environmental sustainability assessment. Science of the total Environment.	Whilst research is not specific to the Qatari context, this is a wide-ranging study that assesses the impact of plastic accumulation on the environment over a global scale. As a result, findings are of relevance to Qatar especially in light of the country's high waste generation rate.
	Water-usage	Senthil Kumar, P and Pavithra, K. (2019). 'Water and Textiles: Consumption, Footprint and Life Cycle Assessment'. Science Direct.	Whilst research is not specific to the Qatari context, the study provides a holistic view of the wider environmental impact of the textile industry upon the environment, relevant to Qatar in light of its strategic position within the sector.
	Degradation of Marine Ecosystems	Qatar University C. Roche, Ronan. (2016). Recreational Diving Impacts on Coral Reefs and the Adoption of Environmentally Responsible Practices within the SCUBA Diving Industry. Environmental Management.	Findings from Qatar University on the significant ecological threat to reefs are specific to the country.  The Recreational Diving research paper was based upon diver behaviour in the Philippines, however its findings on threats posed to marine ecosystems were wide-ranging.
HOSPITALITY	Wastewater	TUI Group	TUI Group undertook a study in a Spanish resort, identifying a substantial reduction in CO2 emissions and water usage as a result of increased towel re-use.
	Habitat destruction	United Nations Environment Programme	Research is centred upon managing the environmental impacts of recreation in deserts.

GDP

Whilst quantitative data was available on the contribution of differing sectors to Qatar’s GDP, in many cases sector data was combined with other sectors meaning an exact figure for % GDP of waste was not available.

SECTOR	SHARE OF GDP IN 2020	SOURCE	ASSUMPTIONS AND CAVEATS
THE BUILT ENVIRONMENT	13%	PSA	<p>The data used to calculate this is from the national accounts of the PSA. Industry sectors included are civil engineering, construction of buildings, specialised construction activities, and manufacture of wood, straw, plaiting, furniture, basic metals, fabricated metal products except machinery, rubber tyres, and non-metallic mineral products.</p> <p>The NDS refers to 2.1% of GDP in 2016 for the construction sector (civil engineering), but the environmental statistics (which potentially defines the sector more broadly) refer to 13% in 2020, following an annual growth rate of 8%.</p> <p>The NDS states that the construction sector between 2011 and 2016 contributed to 12.3% of the labour market.</p>
FOOD AND DOMESTIC WASTE	0.7%	PSA	<p>The data used to calculate this is from the national accounts of the PSA. Industry sectors included are agriculture, manufacture of food products, and manufacture of beverages.</p> <p>An exact figure for % GDP of waste is not available.</p>
WATER	0.1%	PSA	<p>The data used to calculate this is from the national accounts of the PSA, in water supply industry sector including sewerage, waste management and remediation activities.</p>
ENERGY	28%	PSA	<p>The data used to calculate this is from the national accounts of the PSA. Industry sectors included are the extraction of crude petroleum and natural gas, support activities for petroleum and natural gas, and electricity, gas, steam and air conditioning supply.</p> <p>The assumption was made that most of the mining and quarrying sector’s GDP comes from energy. This figure does not include the proportion of GDP for the energy sector which is encompassed in other sectors e.g., manufacturing.</p>
PLASTICS, FASHION AND PACKAGING	0.3%	PSA	<p>The data used to calculate this is from the national accounts of PSA. Industry sectors included are the manufacture of textiles, wearing apparel, leather and related products, paper products, and plastic products.</p> <p>An exact figure for % GDP of packaging is not available.</p>
HOSPITALITY	0.6%	PSA	<p>The data used to calculate this is from the national accounts of the PSA. Industry sectors included are short term accommodation activities, event catering and other food service activities, beverage serving activities, travel agencies, tour operators, reservation services and related activities.</p> <p>The GDP generated from the sector varies between sources, with inconsistent reporting of which activities are included within the scope of ‘tourism’. According to data from the PSA, in 2021, the Accommodation and Food Services sector was worth around 1% of Qatar’s GDP, with the Arts, Recreation and Entertainment sector also making up 1% of Qatar’s GDP.</p>



# Annex 2: Definitions

## SECTORAL SCOPE

SECTOR	SCOPE
HOSPITALITY	The hospitality industry covers a broad area within the service industry which includes lodging, food and drink services, event planning, theme parks, and tourism. It includes hotels, tourism agencies, restaurants and bars. In the context of this study the scope is focused on hotels and tourist activities, including leisure activities. It excludes travel, food and drink services not related to hotels (i.e., restaurants and bars) and event planning.
WATER	The water sector covers all the means and activities dedicated to water resources management and use. It includes activities related to water resource allocation and use across socio-economic sectors (encompassing domestic, agricultural, commercial and industrial water use and waste, as well as water production and conservation). Data related to the water sector is often grouped with wider utilities such as electricity, making it complex to identify the precise impact of Qatar’s water sector on the economy and the environment.
PLASTICS, FASHION AND PACKAGING	For the purposes of this report the plastic sector encompasses the entire life cycle of the material, both upstream and downstream. This includes production, distribution, use and disposal. Fashion and packaging were included as the largest sources of plastic waste.
FOOD AND DOMESTIC WASTE	The food and domestic waste sector covers the whole lifecycle of food and encompasses a broad range of systems including agriculture, food production, imports, distribution, research and regulation as well as domestic waste.
THE BUILT ENVIRONMENT	For the purposes of this report, we define “the built environment” as encompassing the whole lifecycle of a building, from its design to its dismantling. The term therefore includes the construction, the use, the refurbishment, and the eventual demolition of buildings in Qatar.
ENERGY TRANSITION AND RENEWABLES	The energy transition refers to the process of replacing fossil fuels with low carbon alternatives. Renewable energy encompasses sources of energy that are constantly replenished i.e., not finite. Examples include solar, wind and geothermal energy, and hydroelectric power.

## CIRCULAR PATHWAYS

Each sector in the report has been mapped in a circularity pathways table against a set of criteria pertaining to the circular economy, the categories for which are explained below. These categories were developed in response to the workshop and survey feedback. Policy interventions were mapped to the pathway they relate to most strongly, though naturally there will be crossover. For example, water and electricity metering would be categorised under ‘Optimising Consumption Strategies’ because the intention behind the policy would be to allow KAHRAMAA and individual citizens to track consumption with the aim of developing evidence-based policies to reduce waste and overconsumption. However, there is also a clear relationship with ‘Data Collection and monitoring’ and ‘Education and awareness’.

**A Strategic Commitment** is essential to realise the benefits from a circular economy model. Government plays a critical role in creating the enabling conditions for a circular economy by setting direction through policies and ambition, and ensuring legislation drives progress for circularity. Strategic commitment covers government support, infrastructure, legislation and entity policies.

**Economic incentives and financial support** can deliver government commitments and enable a systemic shift. These incentives support businesses and individuals to diversify and make innovative investments. For both businesses and on an individual level, this can encourage and enable the uptake of innovative technologies and sustainable interventions. Incentives can be as simple as money back on the return of a glass bottle.

**Data collection and monitoring** is essential for ensuring that policies and strategies have an evidence-based foundation and will provide both economic and environmental benefits. This data collection could be integrated into circularity and national strategies through the development of national frameworks and strategies, or investments in sustainable technologies specific to Qatar’s geography, climate and socio-economic context. Without a comprehensive data set there is a risk that Qatar misses out on economically beneficial opportunities and international investment.

**Embedding circular practices** ensures that when the public or private sector makes financial decisions and strategies, they consider the environmental impacts. This reduces the cost of implementing sustainable approaches, as they are considered at the start, and also helps to anticipate risks.

**Education and awareness.** As well as designing effective strategies and products there is a need to ensure citizens are educated of the importance of circularity and are actively involved in shaping policies.

**Research and innovation** facilitate long-term growth and are directly linked to the design-based nature of a circular economy. Seizing the opportunity to support system level change through eliminating waste and pollution, circulating products and materials and regenerating nature will be key over the next decade to transform Qatar’s future.

**Optimising consumption strategies** through encouraging shift in behaviour can catalyse public awareness and accelerate the uptake of sustainable technologies and practices. Ambition from business must match government actions to ensure a successful transition, and both national and international businesses must share the responsibility to ensure the decoupling of environmental pressure from economic growth.

**In urban planning and asset management,** public-private partnerships between government and industry are pivotal to creating a framework which uses policy levers to encourage demand for circular solutions, and therefore scalable projects. This should be supported by a compelling evidence base which showcases the value of a circular built environment.

## SCORING

A score of low, medium or high is given for existing efforts for each pathway within each sector. The scores come with the caveat that they have been formulated based on a high-level estimate using only the evidence available within the report (from published sources and consultations) and is therefore not a comprehensive or complete picture. The next stage of work will allow a more robust evidence base for scoring and will also look to determine which pathways within the priority sectors have the greatest potential for circularity.

**Some examples of scoring criteria for each category are:**

**Low** - Little prioritisation with limited to no strategic direction or discernible impetus for change.

**Medium** - Policy or strategy developed but progress is either not significant or not assessed, small-scale private sector led interventions or schemes without significant strategic input from government.

**High** - Well established national policy with a track record of effectiveness, significant focus and funding towards sustainable practices.

# Annex 3:

## Workshop & Survey Results

Global Counsel and Earthna conducted workshops and a survey to engage policy makers, professionals, academia, and civil society within Qatar, capturing their feedback on moving towards a circular economy. Whilst consultations covered a broader range of sectors, we have aggregated this data to align with the six sectors in this report.

### WORKSHOPS

Two workshops were held as part of Qatar Sustainability Week, bringing together professionals to discuss sectors critical to Qatar’s journey towards sustainability.

Within the first workshop, discussions covered the opportunities and challenges for Qatar and its non hydrocarbon sectors in driving circularity, including across the built environment, Hospitality, Plastics including fashion and packaging, and Food and Domestic Waste sectors. Themes emerged across all sectors where stakeholders saw an opportunity for change. One of these was an emphasis on green procurement to encourage sustainable approaches within businesses. The participants felt this was widely applicable to all sectors included in the discussion. Another common theme was producer responsibility and consumer behaviours, as well as introducing regulations that could create accountability on both ends.

In the second workshop, discussions covered opportunities and challenges for Qatar within the energy transition, renewables, and water balance sectors. The importance of innovation, research and development was a common theme and was highlighted as a particular opportunity for Qatar in the diversification of its economy. Another common theme was the need for more collaboration between sustainability experts and the general public. Improved data gathering across the three areas was also identified as a way to support innovation and improve transparency in relation to consumption. It was suggested that this would help to spread awareness of the sustainable initiatives already implemented in Qatar, learn lessons from them and also make the public more aware of how their decisions impact the environment, people, and economy..

### SURVEY

Feedback was received from over 130 stakeholders working across a diverse range of sectors including climate change and organisational sustainability. Of the survey respondents, 80% were non-Qatari nationals living in Qatar, 6.7% were Qatari citizens, and stakeholders residing outside Qatar formed 13.4% of the remaining audience.

The survey asked participants to share information on the following sectors: construction, health, plastics, fashion, water, energy, domestic waste, food, and packaging. For the purposes of this report some sectors have been combined.

In the survey, respondents were asked the following question:

- For each sector, please indicate the extent to which you have some knowledge of it and the environmental or sustainability issues it faces.
- Which sector do you think has the greatest potential to achieve positive environmental and/or economic impact by moving toward a circular business model? By circular business model, we mean a system that extends the lifecycle of products through conserving and re-using resources at their maximum utility.
- You said [sector] had the greatest potential to achieve positive environmental and/or economic impact by moving toward a circular business model. In a sentence or two, please explain why.
- Below are a number of potential challenges that might prevent [sector] from moving toward a circular business model. Please indicate which of these you consider to be the most significant barrier(s) for this sector. Select up to three.

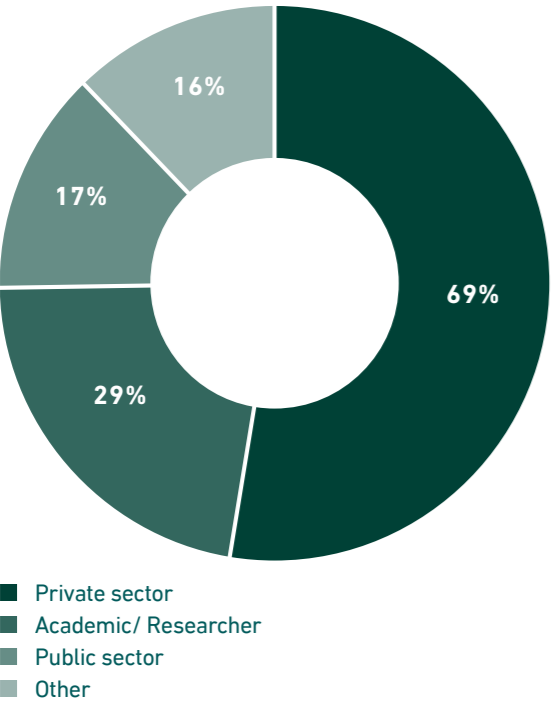
- Below are a number of potential changes that might help [sector] to move toward circular business model. Please indicate which of these you believe would have the biggest positive impact for this sector. Select up to three.
- Based on your own experience, what is an example of best practice in moving toward a circular business model? Examples can be drawn from any sector or organisation and can be based on experiences within Qatar or from elsewhere. Please provide some detail to describe the case study - and your account of what the broader learning is for other organisations and sectors.

Overall, stakeholders self-identified that they had either significant or reasonable knowledge of the Water (77%), Energy (69%) and Domestic Waste (66%) sectors. However, respondents had the least amount of knowledge of the Fashion sector, with only 32% respondents stating they had significant or reasonable knowledge of this topic area.

Respondents identified particular sectors that they believed had the greatest potential to achieve a positive environmental and economic impact by moving towards a circular economy. Out of 110 responses, Food and Domestic Waste was identified as the sector with the greatest potential by the largest number of respondents (24%), closely followed by the built environment (21%) and Plastics, Fashion and Packaging (20%). Reasons given for their selection included the Built Environment sector’s potential for effective resource recovery alongside the Domestic Waste sector’s potential to mitigate against Qatar’s high per capita waste generation rate. Meanwhile, Hospitality was identified by only 4% of respondents as the sector with the most potential.

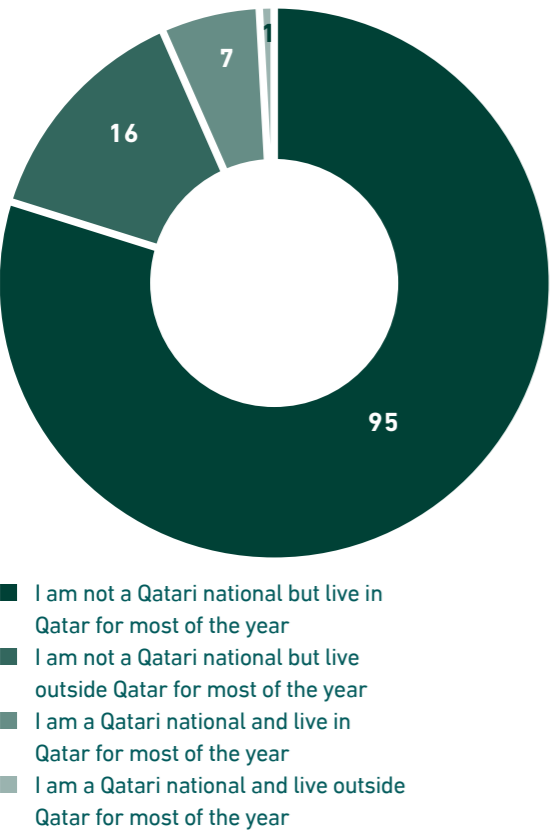
PROFESSION

Number of rspondents selecting each option as their profession



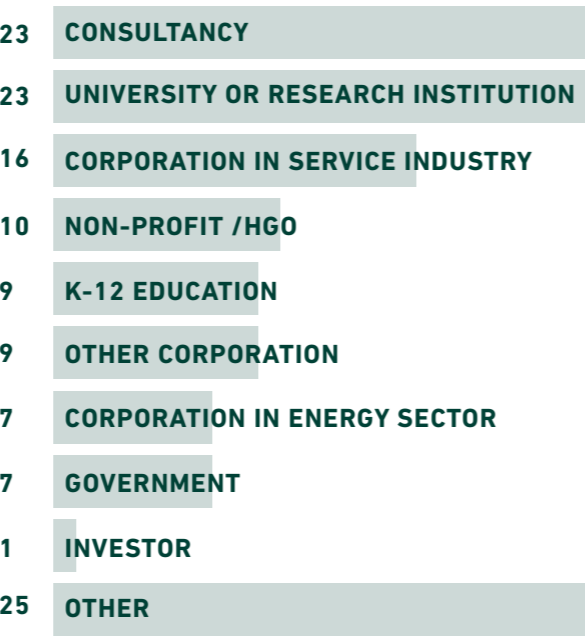
RESIDENCY/ NATIONALITY

Number of rspondents selecting each option as their current residency and nationality status



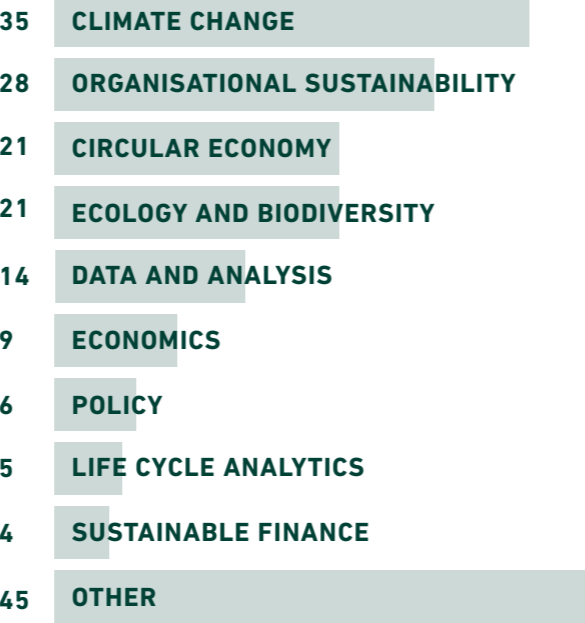
INSTITUTION

Number of rspondents selecting each institution in which they work



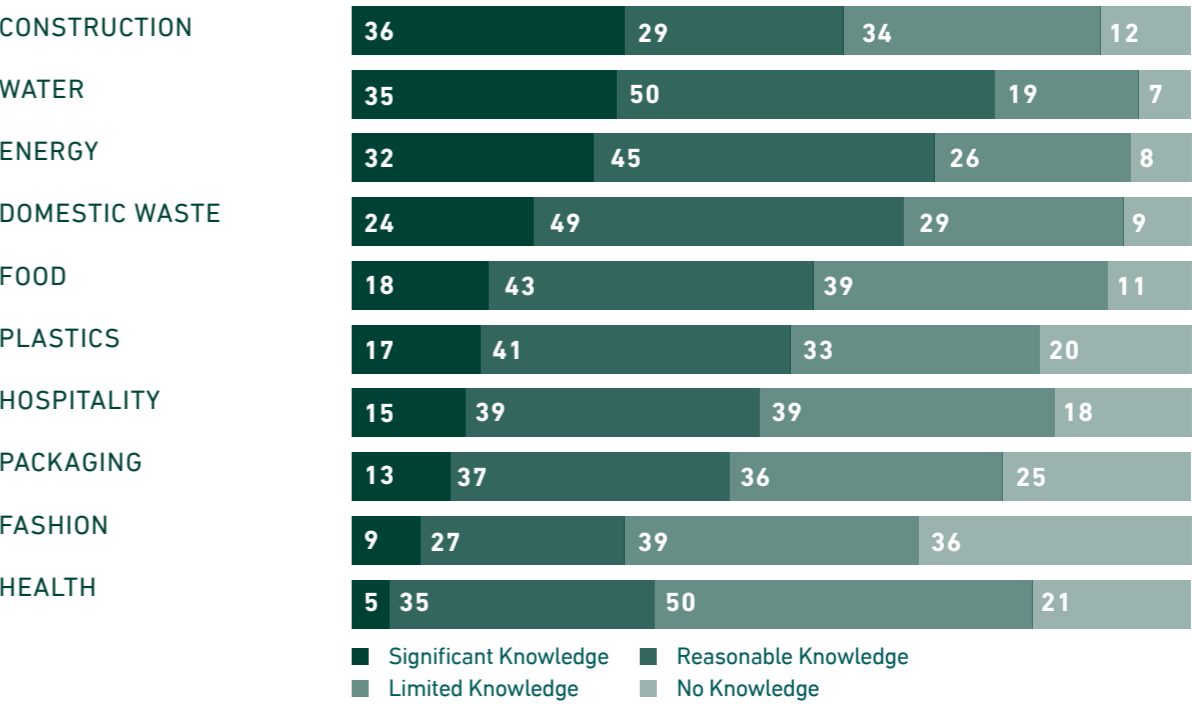
AREA OF EXPERTISE

Number of respondents selecting each option as one of their areas of expertise



KNOWLEDGE OF DIFFERENT SECTORS

Number of respondents with different levels of knowledge in each sector



SECTOR WITH GREATEST POTENTIAL TO REACH A CIRCULAR ECONOMY

Number of respondents selecting each sector as having the greatest potential to reach a circular economy



# Hospitality – challenges and changes

## MAIN BARRIERS TO MOVING TO CIRCULAR ECONOMY

Number of respondents selecting each challenge as being a top 3 barrier preventing the sector moving toward a circular economy



## MOST IMPACTFUL CHANGES IN MOVING TO CIRCULAR ECONOMY

Number of respondents selecting each change as having a top 3 impact in moving toward a circular economy in this sector



# Construction – challenges and changes

## MAIN BARRIERS TO MOVING TO A CIRCULAR ECONOMY

Number of respondents selecting each challenge as being a top 3 barrier preventing the sector moving toward a circular economy



## MOST IMPACTFUL CHANGES IN MOVING TO A CIRCULAR ECONOMY

Number of respondents selecting each change as having a top 3 impact in moving toward a circular economy in this sector



# Health – challenges and changes

## MAIN BARRIERS TO MOVING TO A CIRCULAR ECONOMY

Number of respondents selecting each challenge as being a top 3 barrier preventing the sector moving toward a circular economy



## MOST IMPACTFUL CHALLENGES IN MOVING TO A CIRCULAR ECONOMY

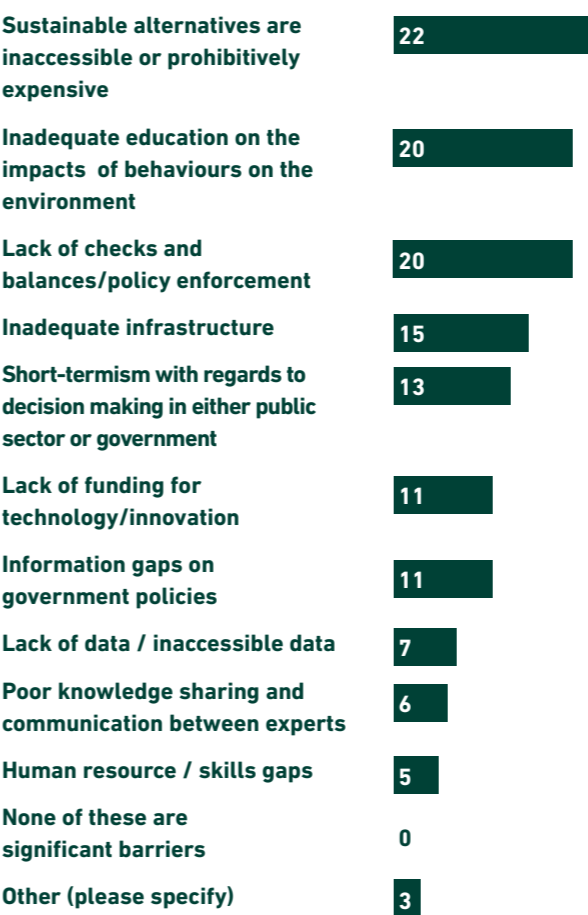
Number of respondents selecting each change as having a top 3 impact in moving toward a circular economy in this sector



# Plastics – challenges and changes

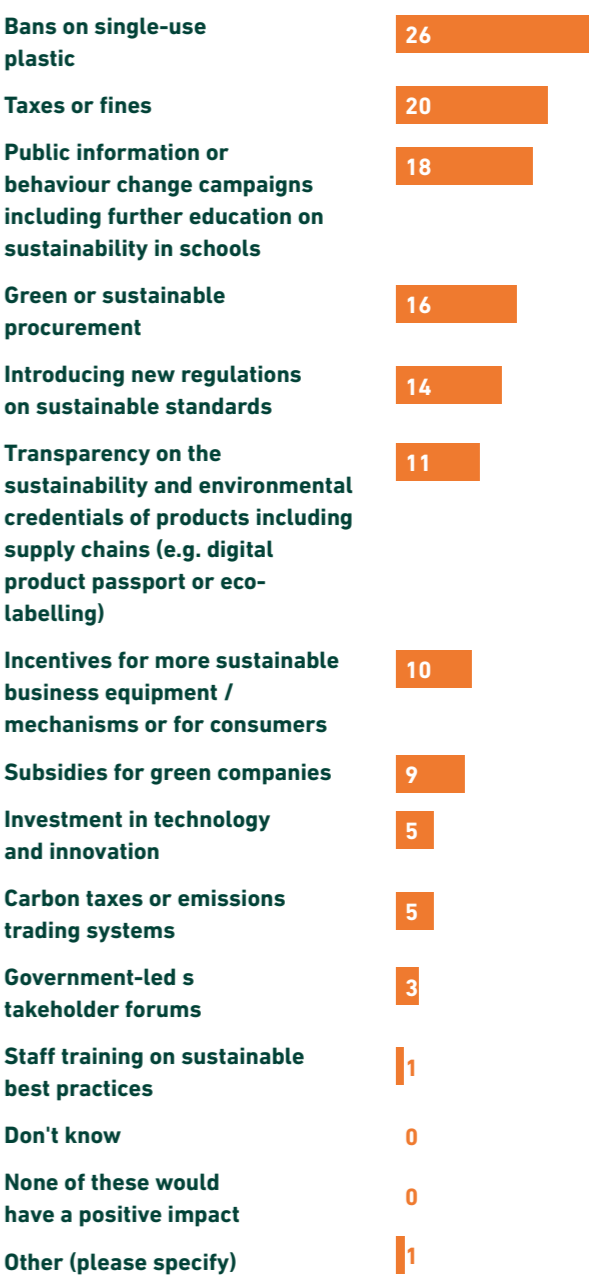
## MAIN BARRIERS TO MOVING TO A CIRCULAR ECONOMY

Number of respondents selecting each challenge as being a top 3 barrier preventing the sector moving toward a circular economy



## MOST IMPACTFUL CHALLENGES IN MOVING TO A CIRCULAR ECONOMY

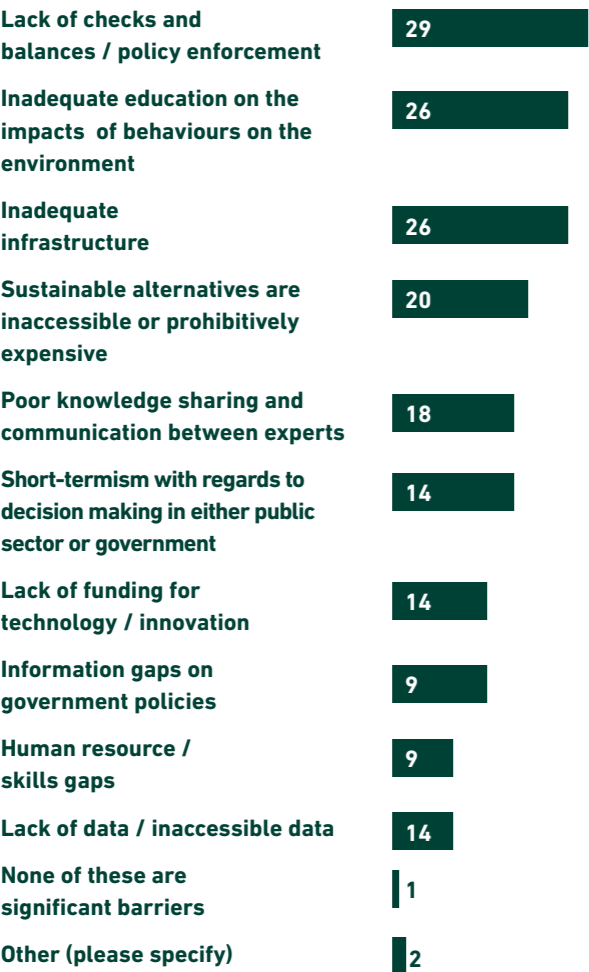
Number of respondents selecting each change as having a top 3 impact in moving toward a circular economy in this sector



# Water – challenges and changes

## MAIN BARRIERS TO MOVING TO A CIRCULAR ECONOMY

Number of respondents selecting each challenge as being a top 3 barrier preventing the sector moving toward a circular economy



## MOST IMPACTFUL CHALLENGES IN MOVING TO A CIRCULAR ECONOMY

Number of respondents selecting each change as having a top 3 impact in moving toward a circular economy in this sector



# Fashion – challenges and changes

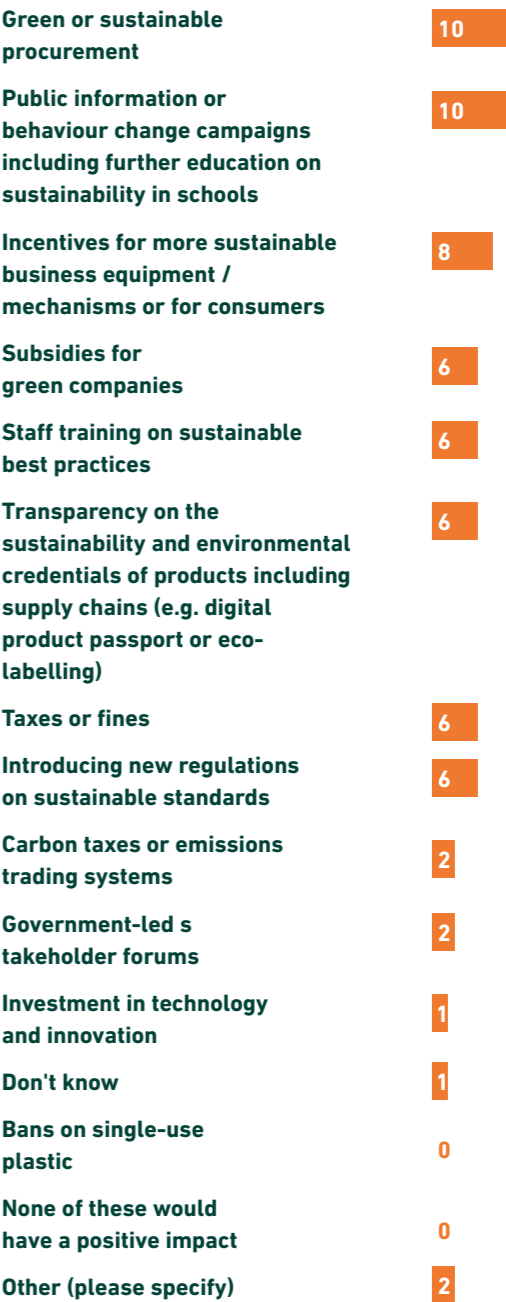
## MAIN BARRIERS TO MOVING TO A CIRCULAR ECONOMY

Number of respondents selecting each challenge as being a top 3 barrier preventing the sector moving toward a circular economy



## MOST IMPACTFUL CHALLENGES IN MOVING TO A CIRCULAR ECONOMY

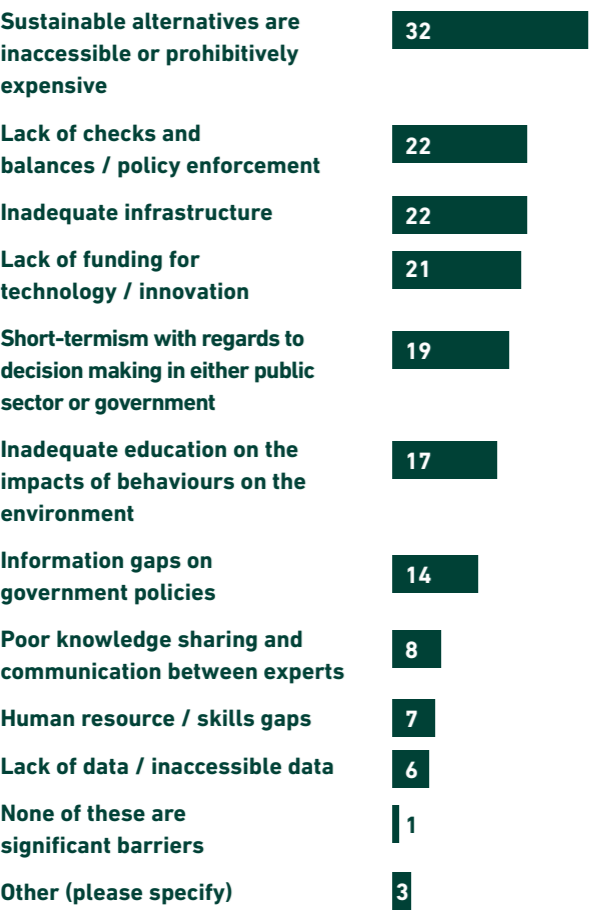
Number of respondents selecting each change as having a top 3 impact in moving toward a circular economy in this sector



# Energy – challenges and changes

## MAIN BARRIERS TO MOVING TO A CIRCULAR ECONOMY

Number of respondents selecting each challenge as being a top 3 barrier preventing the sector moving toward a circular economy



## MOST IMPACTFUL CHALLENGES IN MOVING TO A CIRCULAR ECONOMY

Number of respondents selecting each change as having a top 3 impact in moving toward a circular economy in this sector



# Domestic waste – challenges and changes

## MAIN BARRIERS TO MOVING TO A CIRCULAR ECONOMY

Number of respondents selecting each challenge as being a top 3 barrier preventing the sector moving toward a circular economy



## MOST IMPACTFUL CHALLENGES IN MOVING TO A CIRCULAR ECONOMY

Number of respondents selecting each change as having a top 3 impact in moving toward a circular economy in this sector



# Packaging – challenges and changes

## MAIN BARRIERS TO MOVING TO A CIRCULAR ECONOMY

Number of respondents selecting each challenge as being a top 3 barrier preventing the sector moving towards a circular economy



## MOST IMPACTFUL CHALLENGES IN MOVING TO A CIRCULAR ECONOMY

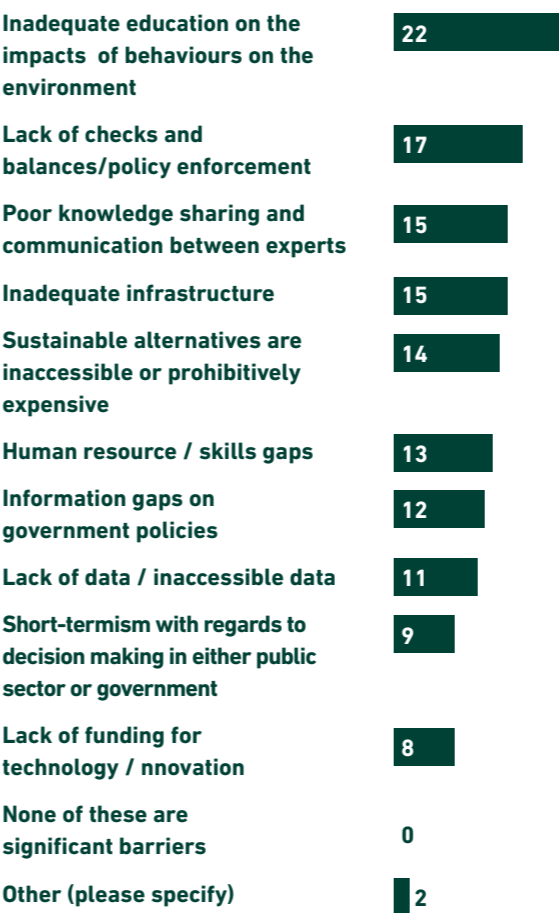
Number of respondents selecting each change as having a top 3 impact in moving toward a circular economy in this sector



# Food – challenges and changes

## MAIN BARRIERS TO MOVING TO A CIRCULAR ECONOMY

Number of respondents selecting each challenge as being a top 3 barrier preventing the sector moving toward a circular economy



## MOST IMPACTFUL CHALLENGES IN MOVING TO A CIRCULAR ECONOMY

Number of respondents selecting each change as having a top 3 impact in moving toward a circular economy in this sector



# Annex 4:

## Glossary

A Glossary of common terms, organisations and abbreviations utilised within this report:

<b>CCS</b>	Carbon Capture and Storage. The process of capturing and storing carbon dioxide to prevent it entering the atmosphere.
<b>CFD</b>	Contract for Difference. These contracts provide developers with direct protection from volatile wholesale prices, protecting consumers from paying increased support costs when electricity prices are high.
<b>EPR</b>	Extended Producer Responsibility. EPR places the burden for treatment or disposal of products upon producers through a “polluter pays” approach.
<b>ESG</b>	Environmental and Social Governance.
<b>GCC</b>	Gulf Cooperation Council.
<b>GDP</b>	Gross Domestic Product. GDP is the total market value of goods and services produced within an economy.
<b>GHG</b>	Greenhouse gases. Greenhouse gases are gases in the atmosphere including carbon dioxide, water vapour, methane and nitrous oxide that absorb infrared radiation and trap heat.
<b>ISO</b>	International Organisation for Standardization. Develops standards including environmental, social, and economic requirements, internationally agreed by experts.
<b>KAHRAMMA</b>	The Qatar General Electricity and Water Corporation, established in July 2000 to regulate and maintain the supply of electricity and water for the population of Qatar.
<b>LNG</b>	Liquefied Natural Gas. This is natural gas cooled down to liquid form for efficient transport.
<b>MECC</b>	Ministry of Environment and Climate Change. The Ministry is responsible for Qatar’s environmental and climate change policy.
<b>MENA</b>	Middle East and North Africa.

<b>MME</b>	Ministry of Municipality and Environment. The Ministry is responsible for Qatar’s urban planning, as well as land surveying, acquisition, and management. It is also the Ministry at the forefront of environmental protection.
<b>NDC</b>	Nationally Determined Contribution. These are non-binding country emissions reduction targets.
<b>NDS</b>	National Development Strategy. Qatar’s NDS sets out a pathway to achieve the goals of Qatar’s National Vision 2030. The Second (current) NDS applies from 2018-2022.
<b>QE</b>	Qatar Energy. This is the state-owned company responsible for operating all oil and gas activities.
<b>QNV</b>	Qatar National Vision 2030. This is Qatar’s overarching vision for economic, social, human, and environmental development.
<b>QPS</b>	Qatar Planning and Statistics Authority. This is Qatar’s national statistical system.
<b>QSE</b>	Qatar Stock Exchange.
<b>UNFCCC</b>	United Nations Framework Convention on Climate Change.

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