



The Circular Economy in Qatar 2

Issues for Discussion

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Foreword

About This Report

This report is the second stage in a programme of work to develop data-driven policy recommendations. These recommendations support Qatar and other countries in the wider MENA region to diversify their economies and build a sustainable, circular economy for future generations. The report is a scoping exercise ahead of the final stage of work, which will involve conducting a life cycle analysis across Qatar's entire domestic economy. The results of this and all previous work will be used to develop detailed, robust policy recommendations.

The work has been produced by a team of policy experts, academics, and graphic designers. The first report drew on a series of consultations to engage policymakers, professionals and civil society within Qatar. The consultations reflected views on the opportunities and challenges that Qatar faces related to circularity. They also provided a range of qualitative data on the interventions being taken by businesses and the government and proposed solutions and new potential interventions. The first report explored six sectors: hospitality, water, plastics, food, the built environment, and energy transition and renewables. This report builds on the findings and uses quantitative and qualitative data to hone and develop detailed policy recommendations for three sectors identified during the first stage as having the greatest potential for moving towards a circular economy. These sectors are hospitality, food and domestic waste, and the built environment.

Executive Summary



MAPPING AN EQUITABLE PATHWAY TO A CIRCULAR ECONOMY

A recent estimate indicates that, less than 8% of all human material produced is currently recycled back into the global economy.^[1] This low percentage is a reflection of humankind's extremely high consumption and the waste burden this creates. It increasingly gives rise to grave concerns about the long-term sustainability of our current global economic system. To many it is a warning about the impacts of maintaining the current linear economic model, the resultant depletion of non-renewable natural resources and the critical planetary wide biodiversity loss that has ensued.

When considered optimistically, it is also a measure of the potential that exists to improve the sustainability of our resource-use and grow a sustainable global economy.

Some may argue that achieving both is impossible as the concepts are mutually exclusive, a conceptual oxymoron no less. However, much recent work has been carried out that attests to the viability of achieving both economic growth and greatly reducing mankind's dependency on the planet's limited resources. At the heart of that approach lies the concept of a circular economy.

A circular economy greatly reduces the environmental burden of our non-sustainable linear economic system by adoption of the tried and well tested three 'Rs': reduce, reuse and recycle. Waste can therefore be redefined as only that material that 'drops out of the global economic loop of utility' and is thus greatly reduced. When waste does occur, it has to be 'safely returned to Earth'. The 'safely' aspect meaning that there are no impacts on the integrity of the planet's biosphere as a consequence of this process.

The transition to a circular economy then, is not just about waste recycling and the use of renewable materials. It infers a global system that redistributes vital materials and maximises the productivity and cyclical lifecycle of all products and materials by designing out waste and designing in renewability. The 'waste outputs' from one industry (including material that has come to the end of its 'economic life-cycle' within each sector), therefore become the inputs for another industry.

Implicit in this transition to a circular economy is the need to make radical changes to manufacturing and consumption across the value chain, which is no small endeavour. Across the policy and political landscape in all countries, and at a personal level, this requires a multitude of deliberate and focused actions to achieve the transition. It means embracing new policy thinking, the acceleration of new technological invention, the delivery of innovative business models, improvements to everyday resource production and consumption practices, and lastly the adoption of new behaviours.^[2]

Across the world, each country will need to plot a transitional pathway to create a truly circular economy. As previously stated, this is not an easy task and even countries that have a reputation for instigating enlightened sustainability policies and are 'early adopters' of circular economic principles, have some way yet to go to achieve comprehensive circularity. Whatever the pathway adopted that leads a country towards a circular economy, it should be recognised that this process also needs to be equitable if it is to be truly sustainable.

QATAR'S CIRCULAR ECONOMY PATHWAY

A recent study by the Gulf Cooperation Council (GCC) found that the region could save up to \$138bn by 2030 by transitioning to a circular model.^[4] There is therefore, a good rationale for Qatar to seek its own circular economic pathway. Moreover, commitment to mapping this pathway is inherent within Qatar's National Vision (QNV) 2030 and the aspirations it espouses. Since its publication, and that of the subsequent National Development Strategies (NDS), Qatar has made good progress despite the practical challenges that come with integrating sustainability within an accelerated pace of development.^[3]

A crucial part of the QNV is ensuring that the cultural and Islamic values that are core to Qatari identity, underpin the development and transformation of the Qatar's economy. Central to those Islamic values are the rights of human beings and the environment. Allah "has raised up the heaven and has set a balance that you may not transgress the balance".^[4] By shifting to a circular economy, Qatar can protect society, while transforming the economy and preserving the balance between nature and human development.



Hospitality

Hospitality is a growing sector and an especially important one for Qatar's economic diversification.

83%

As global awareness of the issues surrounding sustainability grows, there is increasing demand for sustainable tourism, with 83% of global tourists believing sustainable travel is vital.

The global ecotourism market is expected to reach

\$334bn by 2027^[24]



This offers a significant opportunity for Qatar to capitalise on this growth.

By implementing interventions to increase the circularity of the hospitality sector, Qatar could achieve a reduction in carbon emissions of

0.09MtCO₂e

Such interventions could also lead to savings of over



3 million m³
in water reduction



38GWh
in energy reduction



3,700 tonnes
of waste reduction



Food & Domestic Waste

Central to Qatar's National Food Security Strategy is agricultural self-sufficiency.

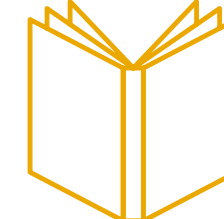


Self-sufficiency offers a significant opportunity to diversify the economy and position Qatar as an innovation hub for sustainable food production.

~60%

Currently, ~60% of domestic waste in Qatar is composed of organic waste, with each person producing over half a tonne of food waste every year.^[8]

Should the recommended policy interventions be implemented, Qatar could save over:



784,000 tonnes

of organic and packaging waste from being sent to landfill



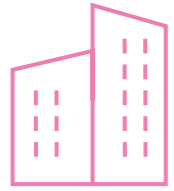
OVER 1.3MtCO₂e

total emissions reductions



QAR 2.1bn a year

net benefits provided



Built Environment

As Qatar's economy grows, so too does its construction sector and population.

Changes made in this sector can have a profound effect on the whole country.

Nearly 60%



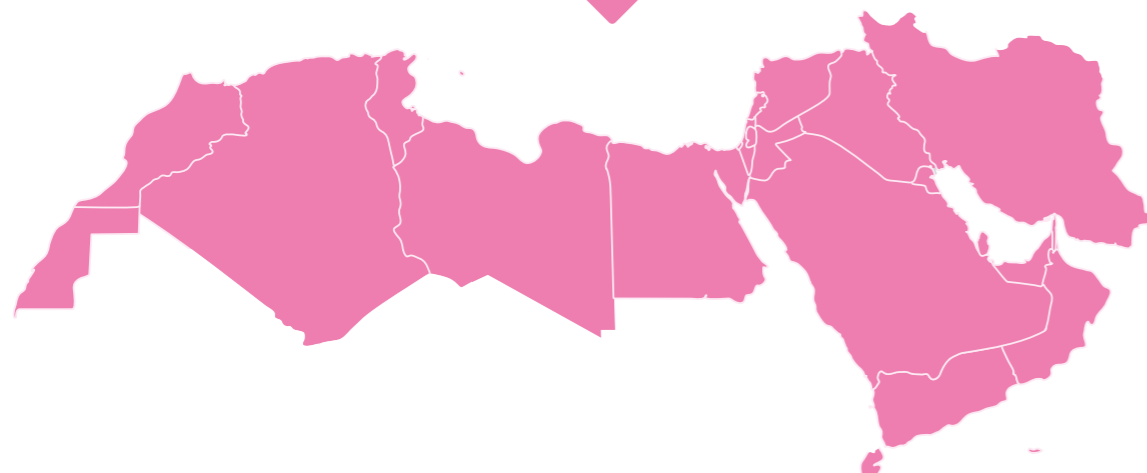
of Qatar's electricity consumption is from the domestic sector ^[3]

Significant reductions can be made in Qatar's carbon footprint each year through the interventions that focus on bringing operation efficiency to the built environment throughout the building's life. Such interventions have the potential to reduce emissions by 0.3MtCO₂e, alongside a potential 1,080GWh of annual energy savings and net benefits of QAR 4bn in addition to increasing health and wellbeing.



Qatar can emerge as a leader in sustainability in the MENA region by building on the World Cup legacy and other sustainable developments.

Qatar has the opportunity to become an innovator and leader, driving progress to green the built environment sector throughout the MENA region.



OUR APPROACH: POTENTIAL, PRIORITISATION, IMPACTS

An initial study sought feedback through workshops and surveys on both:

- the barriers of moving to a circular economy and;
- the opportunities that could be realised across six sectors (hospitality, water, plastics (including fashion and packaging), food and domestic waste, the built environment, and energy transition and renewables.

Responses suggested that hospitality, food and domestic waste, and the built environment had the most opportunity to develop in line with a circular economic agenda and/or were growing areas of the domestic economy with significant future potential. Energy and water will be considered separately. This report builds on the policy approaches identified in those initial discussions. It seeks to discern which policies and interventions could have the most impact, are practicable, and are likely to be cost effective.

Policies and interventions have been considered under the umbrella of four policy levers:

- financial;
- legislative;
- enabling approaches;
- and awareness raising

Each policy intervention has been assessed to determine how practical they would be to integrate into Qatar's socio-economic system and the impact they would have on people, the economy, and the environment.

Three methods were used to achieve this:

- 1 A survey of over 100 experts, businesses and policymakers in Qatar and the wider MENA region. Respondents were asked to provide views on how the policy interventions can align with and support the Qatar National Vision 2030 (QNV).
- 2 A series of targeted in-depth interviews with 12 key policymakers, academics and stakeholders in Qatar, focused on those who would be responsible for implementing the policy recommendations identified in the report, including ministries, hotels and private-sector companies in the target sectors.
- 3 Extensive desk-based research across the MENA region, Europe and beyond to identify policy impact assessments that could be adapted to assess the economic, human and environmental impact of each policy and intervention in the Qatari context. Assessments were considered alongside national priorities and values including the Qatar National Vision and the 3 pillars of sustainability. ^[6]

Through our initial consultations, we identified a holistic approach as necessary to transition to a circular economy. No single policy can achieve this transition alone so, Qatar needs to develop a framework that harmonises policies to collectively address the barriers to circularity.

The levers found to be most effective were:

LEGISLATIVE
Regulations for reporting, infrastructure and certification

ENABLERS
Technology, greening supply chains, data collection

AWARENESS RAISING
Education campaign, use of media and advertising

Under these levers, we identified specific interventions and tested them to determine how practical they would be to integrate into Qatar's socio-economic system and the impact they would have on the people, economy and environment.

OUTCOMES

HOSPITALITY

Opportunities to reduce the negative environmental impacts offer truly sustainable services



Potential for circular economy dynamics. Internationally very few government policy interventions are hospitality specific. However, the sector tends to voluntarily adapt sustainable business strategies from other sectors to improve its operational efficiency and meet customers demand for responsible services. The sector is therefore, often influenced instead by broader, built environment, transport, energy, and waste related policies that were instigated to target the whole economy. As the hospitality sector in Qatar expands, there are benefits to a more centralised approach that would ensure that hospitality can be seen to be within a credible country-wide for eco tourism.

Key challenges:

- Data collection regarding both current hotel efficiency and visitors' concerns and priorities, if shared throughout the sector, could help ensure that Qatar's hospitality sector and Tourism Authority and greatly informs future policy development.
- A mandatory waste management policy based on the 5Rs* across the sector is crucial.
- Developing country-wide green procurement policies that lead the economy collectively toward establishing a more sustainable supply chain, greatly benefits the hospitality sector.
- Raising awareness of both guests and staff reinforces the significance and implementation of sustainable policies that affect hospitality services.

Assessed benefits: Net economic benefits across all the policies and interventions explored were estimated to be over QAR 114m each year. A sustainable tourism services sector would also bring increasing employment opportunities and support the local economy and new business models. Total carbon emissions savings across all the policies reviewed are estimated to be 0.09MtCO_{2e} per year.

FOOD AND DOMESTIC WASTE

There are significant opportunities to reduce food packaging waste, the negative health and environmental impacts that this waste causes.



Potential for circular economy dynamics. Food consumption and packaging are a major source of waste. Landfill produces significant volumes of methane, a potent greenhouse gas. Thus food related product and service innovation have the potential of significantly reducing negative environmental impacts and improving economic circularity.

Key challenges. Decisions over diet are a highly personal choice, with few countries willing to regulate the general public's diet. It is therefore unsurprising that the interventions that were most popular in surveys and interviews focused on nudging consumer behaviour through awareness campaigns and tackling the food waste. Shifting behaviour, reducing packaging and greening the supply chain are critical in this sector in order to make effective changes. As in all sectors, data collection is important to ensure that the effectiveness of interventions can be monitored over time and targeted interventions can be introduced.

Assessed benefits: Net economic benefits across all the policies and interventions explored were estimated to be QAR 2.1bn each year as well as increasing employment opportunities. Total carbon emissions savings across all the policies reviewed are estimated to be 1.3MtCO_{2e} per year.

BUILT ENVIRONMENT

Opportunities to reduce negative impacts on the environment and human health through extending the lifecycle of the built environment.



Potential for circular economy dynamics. The policy interventions that were found to be most effective were more often interventionist approaches that rely on government regulation. Consultation stressed that a holistic approach could only be achieved via development of a 'Sustainable Buildings Strategy' for both existing and new buildings'. These have been highly effective in other jurisdictions, such as Europe and the UK, in setting direction and creating certainty in the policy landscape for businesses. New business opportunities and innovation that contribute to a sustainable economy also emerge from such holistic intervention.

Key challenges. An important challenge raised throughout consultations was the absence of government regulation. Public sector-led legislation is key to the wider uptake of circular economy practices. As in other areas, there is an inherent weakness in relying on non-local data and methodologies for impact assessments; fully customised impact assessments with accurate local data will improve this.

Assessed benefits. Net economic benefits across all the policies and interventions explored were estimated to be QAR 4bn a year as well as increasing employment opportunities. Total carbon emissions savings across all the policies are estimated to be 0.3MtCO_{2e} per year.

The top three most impactful interventions based on our findings were:



Hospitality



Mandate certification standards e.g., **Green Key Awards** across all hotels. Estimated benefits each year: net economic savings **QAR 83m per year**, emissions **0.07MtCO_{2e}**, **1.5 million m³ water reduction**.



Improved access to data through **smart metering and tourist surveys** to enable targeted interventions. Estimated benefits each year: net economic **savings QAR 31m per year**, emissions **0.02MtCO_{2e}**, **1.5 million m³ water reduction**.



Adoption of **the PLEDGE** on Food Waste hotel benchmarking standard. Estimated benefits each year: net economic savings **QAR 1.4m per year**, emissions **0.001MtCO_{2e}**, **2kt food**.



Food & Domestic Waste



Waste collection and bio digesting. Estimated benefits each year: net economic savings **QAR 1.3bn per year**, emissions **1.06MtCO_{2e}**.



Capturing methane from existing landfill at Mesaieed. Estimated benefits each year: net economic savings **QAR 13m per year**, emissions **0.013MtCO_{2e}**.



Extended producer responsibility scheme to put the cost of recycling on packaging producers. Estimated benefits each year: net economic savings **QAR 647m per year**, emissions **0.14MtCO_{2e}**.



Built Environment



Mandatory energy performance certificates for all existing buildings. Estimated benefits each year: net economic savings **QAR 10m per year**, emissions **0.05MtCO_{2e}**.



Increase the proportion of recycled aggregate. Estimated benefits each year: net economic savings **QAR 5.8m per year**, emissions **0.009MtCO_{2e}**.



Adopt Leadership in Energy and Environmental Design in all new buildings. Estimated benefits each year: net economic savings **QAR 3.7bn per year**, emissions **0.15MtCO_{2e}**.

Five strategic principles for building a circular economy

The MENA Region is a developing region with fast growing economy and high potential for circularity.

What is needed to expedite green growth is to lay the foundations for a range of policy interventions. There is a place for a top-down approach using legislation supported by education and focused messaging and, where necessary, enforcement measures. This would demonstrate the government's motivation and leadership, sending a strong signal to businesses and society in Qatar and internationally. This in turn would provide the private sector with the framework and certainty to follow suit and equip the population with the tools and infrastructure that will allow them to successfully make this transition.

From analysis of data gathered for this report it is possible to distil some key principles to shape a circular economic strategy for Qatar.



1

COLLECT AND USE DATA TO INFORM POLICY

Data collection and generation, remains a significant challenge for developing targeted policy interventions. Emissions data for the sectors is not available, and a coherent data collection strategy across and between sectors does not yet exist. Until it does, policymaking is too dependent on impact assessment methodologies that do not reflect Qatari realities fully. Here, Qatar has a key opportunity to mobilise and improve its data collection and utilisation capability.

2

TAKE A SYSTEM-WIDE APPROACH

There is a need for a system-wide approach to policy making to promote sustainable development and environmental protection in decision making. Developing policies and regulations that provide a roadmap to address gaps in various sectors will lead to more impactful outcomes. Qatar would benefit from a comprehensive "Green Growth Plan" which would support the QNV 2030. The plan would bring together all government departments and outline detailed implementation pathways and key performance indicators to support decarbonisation and biodiversity across the economy.

3

CREATE A ROBUST LEGISLATIVE FRAMEWORK FOR CHANGE

For most of our interviewees, broad legislative approaches – which are currently largely absent – were considered the most necessary and impactful. Legislation offers a clear and powerful framework for change, and findings indicated that regulations and consistent benchmarking were important to enable decision makers to develop evidence-based policies.

4

EDUCATE FOR CONSUMER AND CITIZEN AWARENESS

For new policies to be a successful they need consumer buy-in. One of the main barriers to the circular economy transition is the lack of awareness of sustainable initiatives, laws and incentives already in place. A MENA-wide, first-of-its-kind circular economy hub would help to address this. It would be a one-stop-shop for businesses and the public, generating engagement and promoting initiatives. Ultimately, consumer and citizen awareness is the key to fully unlocking change. Awareness and education-based policy levers such as employee guidance or consumer awareness campaigns should flank legislative change.

5

INTEGRATE CIRCULAR ECONOMY STRATEGY INTO QATAR'S FDI STRATEGY

Qatar should capitalise on its Free Zone strategy and its open approach to FDI. Scaling up financial flows for circular economy innovation enables Qatar to incubate new businesses and entrepreneurs which will diversify its economy.

METHODOLOGY AND NEXT STEPS

This report sets out the best available evidence for the impact of a circular economy transition in Qatar across the three sectors. The assessments in this report should be considered as guides rather than definitive findings. The economic savings have been calculated using the UK's estimate of the social cost of carbon, i.e., the economic cost of emitting one tonne of carbon dioxide. These assessments have relied heavily on equivalent UK and EU impact assessments. These are mandatory requirements for many new policy proposals in many European countries but not used widely elsewhere. The use of methodologies designed for other jurisdictions is acknowledged as an imperfect tool. In some cases, assumptions have had to be made where there were gaps in data available. A full assessment through life cycle analysis, broader economic modelling and data gathering is needed to understand the full impact and potential of these approaches. For some interventions, on-site feasibility studies would be needed to understand costs and benefits. Detailed information on the evidence gathered and the assumptions made for the assessments is available in Annex 2.

Nevertheless, the preliminary conclusions point to potentially significant environmental and economic savings from the interventions identified. Across the three sectors, each year Qatar could benefit from emissions reductions of 1.7MtCO_{2e}, net economic benefits of QAR 6bn alongside social well-being and biodiversity benefits. As a vision of what a circular economy could provide for Qatar across three sectors of the economy, we can be confident in its conclusions. It has shown the value that a circular economy can have to Qatar's people, environment and economy. There are significant opportunities presented by a country-wide shift away from a linear model.

Several interventions stand out as the most viable for Qatar, which will need to be further scrutinised and addressed in the next stage of work. The next stage will involve a world-first, full life cycle analysis of Qatar's entire domestic economy. The insights from this and all other work to date will be used to create a data-backed, policy-driven, bespoke plan for a transition to a circular economy. It will enable the bespoke identification of areas where policy interventions could have most impact for Qatar and set out the strategic pathway, accompanied by a detailed implementation plan for the transition.

Introduction



“For Qatar’s future development, sustainability ranks at the top. It is a key pillar of the country’s national vision and brings together stakeholders from all sectors - LNG, tourism, construction with a distinct ministerial element.”

A circular economy is a system-level framework that optimises the use of materials and products by circulating them within the economy. This circulation eliminates waste, reduces environmental impacts and regenerates nature.^[7] It is not just about eliminating waste; it goes to the heart of sustainable resource use.

A move to a circular economy is a vital step in addressing some of the world’s greatest challenges, including unsustainable resource use, biodiversity loss and declining human health caused by polluting earth’s natural systems. When we start to manage our production and consumption consciously and responsibly, we move towards creating a resilient, healthy ecosystem.^[8] This is no longer considered idealistic or unrealistic.

On a global scale it is estimated that the circular economy could generate USD 4.5trn of additional economic output by 2030 and as much as USD 25trn by 2050.^[9] In Europe, the circular economy could generate savings of up to \$630bn per year.^[9] Realising the considerable benefits, and driven by political priorities such as resource security, the EU has developed an Action Plan for the Circular Economy.^[10] This includes new measures across its economy to reduce emissions and boost biodiversity, increasing resource security and business efficiency.^[10] Qatar would similarly benefit from increased resource security, preserving the environment for future generations and growing the economy. It would also support the diversification of the economy by providing a route to international markets and strategic alignment with Europe and the rest of the world. In the Gulf Cooperation Council (GCC) context, a recent study found that the region could save up to \$138bn by 2030 with a transition to a circular model.^[11] Across the three sectors of focus in this report - food and domestic waste, the built environment and hospitality - there are significant opportunities in Qatar. In the waste sector alone, Qatar could generate an additional \$17bn and create 9,000-19,000 jobs by 2030 through a circular economy model, representing 10% of the current GDP.^[5]

THE QNV 2030: A FRAMEWORK FOR SUSTAINABILITY AND PROSPERITY

In 2008, Qatar published the National Vision 2030 (QNV).^[6] This vision reflects the priorities and values of the Qatari people and seeks to address five major challenges facing Qatar:

1. Modernisation and preservation of traditions;
2. The needs of the current generation and future generations;
3. Managed growth and uncontrolled expansion;
4. The size and quality of the expatriate labour force and the selected path of development; and
5. Economic growth, social development and environmental management.

A circular economy model can help address many of these challenges. This report seeks to support and complement the QNV, particularly around preserving traditions, supporting moral and religious values, national heritage and Islamic values and identity. This report sets out potential approaches for moving toward a circular economy that aligns with these values.

The QNV 2030 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 now and in the future.



Environmental Development and management such that there is harmony between economic growth, social development and environmental protection.

Approach



Policies need to drive the change"

APPROACHES TO POLICY DEVELOPMENT

Policymaking is about designing appropriate responses to guide decisions that can unlock economic potential and support the well-being of the population. However, we must consider other factors, such as cultural and religious values, political ideology, public opinion and international relationships. This means that what is technically a good policy may, in reality, be impractical to implement. In practice, policy design is often top-down, starting with a political ideology, a public campaign or the identification of a particular barrier that needs to be overcome.

Top-down policies generally tend to be decided by the central government of a country or by supranational or multilateral organisations (e.g. the EU or UN). New policies can also be introduced from the bottom-up, whereby they are identified and implemented by local actors (e.g., local authority, city or even business-led policies). More rarely, policies can come from academic research through approaches such as life cycle analysis. They are then adopted nationally or more widely.

With national government-led policymaking, problems or barriers are identified and solutions are then proposed by officials, often in consultation with the general public and industry. In the UK, the Green Book is a core document used to assess spending, policies, programmes and projects.^[12] It uses an elimination process whereby policymakers compile a long list of options and then gradually reduce it through an impact assessment and consultations with end-users. Decision-makers also consider the

impact of a policy on different areas of society and individuals: political, economic, social, technological, legal and environmental. The Green Book requires policymakers to assess the social cost of emissions, impacts on biodiversity and pollution when considering the economic benefits or costs of a policy.^[12] This report has sought to mirror the Green Book's general approach.

The policy development process normally involves a consultation period with the public. In the UK, a green paper is usually the first stage of consultation with the public around policy proposals.^[12] Subsequent discussions influence a more finalised document that details government intent; this is known as a white paper. Policy bills are then debated in parliament, often leading to amendments, before becoming law and being implemented. Evaluation also plays an important role in the evolution of policies. It is key to ensuring they are made to be and remain effective.

A top-down circular economy policy approach is exemplified by the EU's incoming circular economy package, which aims to boost the EU's competitiveness by protecting businesses against resource and price shocks. This aims to facilitate the creation of new business models and innovations and support more efficient production and consumption patterns.^[10]

Businesses have also been instrumental in bottom-up policymaking, reacting to changes in consumer demand, with regulation and policy changes following subsequently. An example is the Building Research Establishment Environmental Assessment Method (BREEAM) in construction.^[13] Established in 1990, it is the oldest established method of assessing, rating and certifying the sustainability of buildings.^[13] Some countries, including the Netherlands, have now adopted BREEAM as a national assessment model. In the UK, it is not mandatory, but government departments require BREEAM ratings on all their buildings, as do most local authorities as part of their planning approval.^[14]

AN ISLAMIC APPROACH TO THE CIRCULAR ECONOMY

Most countries throughout the world, are currently based on a linear, rather than circular, economy and this is true of nearly all the Islamic states. However, a circular economy can be seen to fundamentally align and support Qatar's Islamic values. The consultations highlighted that in Islam, as in other religions and faiths, nature reveals God's power and wisdom, therefore this creation is a sign of God and accordingly it is a source to cherish and not to exploit. Many Muslims recognise that God created a biodegradable earth, and this is a source of inspiration to follow. A circular economy can be a fulfilment of Islamic values and beliefs, offering prosperity, fresh opportunities for production and consumption, and numerous clean, local jobs in the process.

Maqasid al-Shari'ah indicates that whatever is done should be in line with the wellbeing of all stakeholders.^[15] Maqasid al-Shari'ah can be considered under five fundamental pillars to safeguard Nafs (the human self), Din (religion), Aqal (intellect), Nasl (posterity), and Mal (wealth).^[15] Damage to the environment directly impacts on human well-being whether that be through mental health, disease through pollution, extreme weather events or economic growth. A circular economy ensures that Nafs, Din, Aqal, Nasl and Mal are possible for future generations as it returns to the environment what is removed.



"Eat and drink of the sustenance provided by Allah, and do not go about acting wickedly on earth, spreading mischief." (1:60)

The Paris Agreement calls for all mobilised finance to be aligned with limiting global temperature increases to 1.5oC. In recent years we have seen many initiatives that mobilise faith and believers towards climate action; the 2015 Islamic declaration on climate change, the encyclical letter *Laudato Si* ("Praised Be") by Pope Francis, Faith For Earth initiative by UNEP, Al Mizan initiative. There has been a strong international drive to ensure that an ethical-based approach that considers the impact of decisions on the environment is to be integrated into all policy strategies and decision making and aligns with international agreements and commitments. This is not a new approach in Islam where shariah compliant finance principles are built on a foundation of social justice through wealth distribution and fair financial dealings. The principles require that all financial transactions must have a clear and transparent social or development goal.^[16] Ensuring that the government's fiscal strategies align with the circular economy could be seen as a way to support that principle. In addition, Zakat can be a powerful tool for mobilising and achieving international climate finance targets, with the Islamic Development Bank estimating that around \$1trillion a year is raised through Zakat.^[17]

Policy interventions should seek to align with both Maqasid al-Shari'ah and the circular economy to ensure continued prosperity. As set out above, the UK's Green Book establishes a system for quantifying in economic terms the impact that all policy decisions have on biodiversity, climate change and health.^[12] This seeks to ensure that there is not an undue cost to society from policies designed to enhance economic growth. This approach could align with Islamic values of safeguarding prosperity, wealth and the human-self.

CIRCULAR ECONOMY POLICY OBJECTIVES GUIDED BY MAQASID AL-SHARI'AH AND THE QUR'AN.

HOSPITALITY	<ul style="list-style-type: none"> Increasing efficiency and productivity by eliminating waste through efficient energy, water and food use
THE BUILT ENVIRONMENT	<ul style="list-style-type: none"> Enhancement of human well-being and social cohesion by improving living standards and comfort (values: Adl (justice) and Ihsan (doing good))
FOOD AND DOMESTIC WASTE	<ul style="list-style-type: none"> Enhancement of resources by reducing of food waste and creating community solidarity through donation. Composting to increase biodiversity (value: Takaful (solidarity) and Rahma (mercy to all creatures))
CROSS-CUTTING	<ul style="list-style-type: none"> Human development through education Increased productivity through innovative business models Alignment of financial flows with social justice





REPORT DEVELOPMENT

This report is the second stage of work to assess policies and interventions that could support Qatar and the Middle East to transition to a circular economy and realise the economic benefits. The first stage of work sought Qatari views on barriers to moving to a circular economy and opportunities that could be realised from the transition. The report considered six sectors: hospitality, the built environment, food and domestic waste, water, energy transition and renewables, and plastics (including packaging and textiles). Consultation were undertaken through surveys, interviews and workshops and brought together ideas from around the world on approaches that could be effective. This report seeks to examine these proposed approaches in more depth and determine their potential when applied to the Qatari context.

POLICY INTERVENTIONS HAVE BEEN IDENTIFIED BASED ON:

- Areas of highest economic, social, human development, and environmental opportunities, in alignment with the Islamic objectives outlined above;
- The barriers that need to be overcome to achieve these opportunities; and
- International examples of best practice.

Through initial consultations, a holistic approach was identified as necessary to transition to a circular economy. No single policy can achieve this transition alone. So, Qatar needs to develop a framework that harmonises policies to collectively address the barriers to circularity. This report, therefore, categorises policies by four levers:

 <p>Financial Incentives and support, tax cuts, green loans for green investments</p>	 <p>Enablers Technology, greening supply chains, data collection</p>
 <p>Legislation Regulations for reporting, infrastructure and certification</p>	 <p>Awareness Education campaign, use of media and advertising</p>

Under these levers, we identified specific interventions and tested them to determine how practical they would be to integrate into Qatar's socio-economic system and the impact they would have on the people, economy and environment.

This report used four methods of data collection:

- Surveys with experts, businesses and policymakers in Qatar and the wider MENA region;
- Interviews with those who would be responsible for implementing the policies (government officials, businesses, Islamic environmental organisations);
- Impact assessments for each of the recommended policy interventions, based on global examples of similar interventions and transposed to the Qatar context using available evidence and assumptions; and
- Extensive desk research of academic papers and reports.

Impact assessments are policymaking tools used to transparently identify the potential outcomes of policy decisions. These assessments, alongside new policy announcements, are mandatory in many European countries. To convert the outcomes of European impact assessments into Qatar-specific outcomes, this report used data from the Planning and Statistics Authority and Qatari academics, as well as interviews with policymakers and businesses. Where available, we considered the information from European impact assessments alongside research into the actual economic and environmental outcomes. Ideally, we would have used impact assessments from countries in the MENA region, but these were not available publicly. Our assessments take the assumptions made in the European impact assessments at face value and do not interrogate their underlying assumptions.

Based on the findings of our assessments, we ranked policies and other interventions based on their economic costs and benefits and in line with the QNV 2030 principles of "Sound Economic Management" and "Sustainable Economic Diversification".^[6] We also considered environmental benefits, such as reduction in emissions, pollution and land use, as well as the protection of biodiversity. Where possible, we quantified benefits into economic impacts based on the values set out in the Green Book.^[12] Overall human development, food security and health benefits were also considered, as well as the creation of jobs and the education and training of the Qatari population. Through this approach, we drew a balance between economic development needs and protecting the environment and human well-being to determine which policy interventions would achieve the best outcome for Qatar.

This report's assessments should be considered as guides rather than definitive findings. In some cases, we made assumptions where there were gaps in the data available. A full assessment through life cycle analysis, broader economic modelling and data gathering would be needed to understand the full impact and potential of these approaches. Also, in some cases, on-site feasibility studies would be needed to understand costs and benefits. Detailed information on the evidence gathered and the assumptions made for the assessments is available in Annex 2.

Hospitality



Hospitality

Qatar Tourism projected to reach

7 million

visitors / yr by 2030

KEY ACTIONS

Adopt consistent Regulatory Standards for hotels (e.g. Green Key Awards) to ensure they meet minimum sustainability criteria

PLEDGE on Food Waste benchmarking standard for hotels

Access to data, to better inform policy making

Total carbon emissions savings across all policy interventions

estimated at 0.08 MtCO₂e

annually in Qatar



Circular economy is an opportunity to lead by example, but also influence on a local, regional and global scale”



Hotels in Qatar among the most carbon-intensive in the world, with average emissions of

91 kgCO₂

per occupied room per night 4.5 times higher than the global average.

- 1 Nearly half of Survey Respondents saw regulatory standards as a top measure, delivering through the consistent approach and an aid to awareness and understanding.
- 2 Survey respondents identified raising awareness as a top priority action. Mandating the adoption of the PLEDGE (a voluntary certification scheme for reducing food waste) could have a high impact through awareness and waste reduction.
- 3 Data collection currently presents a key challenge for all 3 sectors, not just Hospitality, & is key to enabling informed policy making.

CONTEXT

The UN World Tourism Organisation predicts international tourists will increase from 1.1bn in 2014 to 1.8bn in 2030.^[18] The Middle East, and within it Qatar, experienced some of the highest relative increases in 2022 by welcoming over 80% of pre-pandemic visitors.^[19] It is expected that by 2030 there will be 7m tourists in the region.^[19]

The Qatar National Tourism Sector Strategy 2030 aims to boost GDP from tourism by 5.2% by 2030. In 2020, the sector employed nearly 80,000 people.^[20] Qatar plans to build 20 additional hotels in 2023, adding 15,000 hotel rooms, and another six hotels in 2024.^[21] As part of these plans, and in keeping with the ambitions of Qatar's diversification strategy, the government and private sector aim to invest around \$45bn in the hospitality sector by 2030.^[20] To support the delivery of this goal, the Qatar National Tourism Sector Strategy 2030 identified a number of areas of focus: (i) coastal and desert tourism; (ii) cultural tourism; (iii) business events; (iv) sports tourism; (v) urban and family entertainment; and (vi) cruise tourism.

The FIFA World Cup 2022 demonstrated on the international stage Qatar's sustainability capabilities. The World Cup was the first to receive the international standard ISO 20121 certification for sustainable event management systems.^[22] Qatar designed the stadiums to be reused and consume 30% less energy and 40% less water, with water vapour collected from cooling systems and used to irrigate surrounding stadium landscapes.^[22] Introducing circular economy principles to hospitality could build on this success and help carve a niche within the region, attracting more tourists while protecting the nation's cultural and environmental heritage.



"The [circular economy] is absolutely important because you cannot have a future as a tourism destination if you don't adopt this model"
Anonymous stakeholder from the hospitality sector.

OPPORTUNITIES

Guests are more discerning about sustainability than ever before and want to know that a business has made a conscious decision to address environmental concerns and is minimising its impact. A booking.com survey found that more than 80% of global travellers wanted to travel sustainably.^[23] This market represents a huge opportunity for Qatar, with ecotourism expected to be worth over \$330bn by 2027.^[24] However, Qatar may struggle to maintain its growth without continuing to deepen its environmental credentials. Hotels in Qatar are currently some of the most carbon-intensive in the world, with average emissions of a room in Qatar four and a half times higher than the global average of 21 kgCO₂e per night.^[25] Energy and water consumption are similarly high, with energy use estimated to be nearly three times as high as the average room at 250 kWh a night and water consumption 60% higher than average with over 1,600 litres consumed per night.^[25] Unchecked, rapid growth in tourism can raise emissions and damage fragile ecosystems. Coastal and desert tourism in Qatar has already reduced recoverable coral reef ecosystems to only 2%.^[26] Additionally, the deforestation of mangroves has provoked the disappearance of many wetlands, and desert safaris have degraded natural resources.^[27]



"If you can't measure it, you can't manage it."

POLICY INTERVENTIONS

Hospitality is a cross-cutting sector, and as such, is impacted by policy decisions made across the economy, including the built environment and food. No single intervention or policy could enable the sector to become sustainable; instead, a holistic framework is needed. Based on previous consultations, we identified a range of policies and interventions to overcome barriers such as the need for centralised guidance and improved access to data. Awareness of the importance of protecting the environment is high among tourists, but an understanding of the specific measures needed to achieve it is often lacking. Increasing the awareness of these measures can increase their acceptability and therefore their uptake and success, e.g., reduced towel and room cleaning and the use of refillable bottles. The suggested interventions involve various actions and policy changes aimed at developing centralised guidance. We have outlined the most effective of these interventions below.



MANDATORY CERTIFICATION STANDARDS

The need for consistent regulatory standards was identified as one of the most important interventions by nearly 50% of the respondents. This supports the findings of previous consultations, which determined that hotels would benefit from centralised guidance. Such standards are necessary because some hotels can have difficulty in developing their own sustainability practices and in understanding which approaches can have the most impact and generate cost savings.

Mandating certification standards ensures a consistent approach to sustainability. Certification schemes provide support through staff training and help raise awareness among staff and guests about sustainability issues. They also contribute to improved data collection. However, compliance with the requirements, as well as repeated auditing processes, may prove challenging for smaller businesses. Nevertheless, the interviewees highlighted this intervention as being an effective means of solidifying Qatar's position in the region in terms of sustainable hospitality after the success of the FIFA World Cup in 2022.

This report has explored the impact of mandating the Green Key Awards for Qatar's hospitality sector. As of 2022, Eight hotels have received Green Key Award certification in Qatar, and another 20 were registered with the Qatar Green Building Council to obtain them as of 2022.^[28] By requiring all remaining Qatari hotels to join the Green Key Awards scheme, it is estimated that each year the sector could reap net economic benefits of QAR 86m 83m over a 10 year period, a 0.07MtCO₂e reduction in emissions, save 1.5 million m³ in water, and a 1.8kt reduction in waste. These savings would vary depending on the efficiency measures already in place in these hotels. The government could offer incentives to hotels to support uptake, such as paying for the cost of certification.



HOTEL SMART METER SYSTEMS

Previous consultations identified improved access to data as a key challenge for the hospitality industry. Improved data access would provide the government and hospitality industry with the necessary information to make targeted and impactful interventions and enable progress to be monitored.

The importance of data collection is often undervalued but can be a powerful tool for action when combined with other initiatives. Survey respondents ranked data collection last. However, as acknowledged by Kahramaa, when awareness raising is paired with smart metering, it can achieve high results.^[29] Kahramaa, aims to install 600,000 meters in Qatar by the end of 2023.^[35] It is unclear what Kahramaa's progress is against this target and whether smart meters have already been rolled out to all hotels. However, if all Qatari hotels implemented smart metering systems, they could achieve net economic benefits of over QAR 43m 31m over a 10 year period each year, a saving of over 0.02MtCO₂e, a reduction in energy use of 38GWh, and 1.5 million m³ less water consumption.

Qatar Tourism highlighted during the interviews that the collection of tourism "insights" on ecotourism and the impact of tourism on the Qatari environment and biodiversity could also greatly contribute to the tailoring of policies to the specific context of the Qatari hospitality industry. Moreover, Qatar Tourism emphasised that clear and measurable data is key to holding private sector partners accountable. In turn, this could give rise to economic, environmental, human and social benefits. However, these interventions would not be as impactful when implemented alone.

Other forms of data collection, such as the use of QR codes, guest room management systems and digital check in and out, may also provide some information on consumer behaviour to industry members and policymakers.



MANDATING FOUR AND FIVE-STAR HOTELS TO SIGN UP TO THE PLEDGE ON FOOD WASTE

Mandating all four and five-star hotels to become signatories to the PLEDGE on Food Waste has the potential to be highly impactful. The PLEDGE is a voluntary certification scheme which focuses on reducing food waste and increasing awareness of best practices through extensive training for hotel staff. [30] If all four- and five-star hotels in Qatar were to join this scheme each year it would have a net economic benefit of QAR 12m over a 10-year period, reduce emissions by 0.001MtCO₂e each year and save 2kt of food from being wasted.

Interventions to increase the awareness of guests and staff around sustainable approaches could be effective when combined with measures such as certification and smart metering, as well as less proven interventions such as financial incentives and reward schemes. Over a third of the survey respondents suggested that raising awareness would be one of the most impactful interventions. However, awareness-raising efforts alone are unlikely to deliver significant benefits compared to their cost. The measures that can lead to real behavioural changes include providing training to staff on best practices, displaying information for guests and sharing information on the certification schemes and their success.

CONCLUSIONS

Opportunities to reduce negative impacts on the environment and human health in this sector are widespread. Qatar could enjoy net economic benefits of QAR 114m each year across all the policies and interventions explored, as well as increasing employment opportunities and supporting the growth of the sector. Also, Qatar could save total carbon emissions of 0.09 MtCO₂e per year across all the policies.

In addition to the approaches above, we considered other initiatives, including reward schemes and incentives for guests and staff to recycle or reduce the number of times they have their towels washed. This was a popular proposal among survey respondents. However, little evidence is available on the effectiveness of these schemes on guest behaviour and the environment. Some hotel chains have ended schemes as they discovered that reward points had little impact on guest behaviour and most (70%) of points went unclaimed. We found that reward schemes are likely to be more effective if paired with other approaches, such as increasing guest and staff awareness. This report discounts other forms of financial incentives, such as tax credits, as tax rates are very low in Qatar, particularly for Qatari-owned businesses. Details of all the proposals can be found in Annex 2.

Through the development of this report, we found that internationally, very few policies or interventions are hospitality specific. Those that are, tend to be voluntary rather than mandated by the state. The sector is often impacted instead by building, transport, energy and waste policies that target the whole economy and benefit from having more far-reaching impacts. However, as Qatar expands its hospitality sector, it may benefit from having a more centralised approach to ensure that the country as a whole remains attractive to international visitors. Data collection around current hotel efficiency and the concerns and priorities of visitors could help inform future policy development and ensure that Qatar stays relevant. Staff training and awareness of the support and benefits available would also support this shift.

POLICY	CATEGORY	ECONOMIC	ENVIRONMENTAL	HUMAN	SOCIAL	PRACTICALITY
<p>FINANCIAL INCENTIVES FOR INDIVIDUALS AND BUSINESSES THAT RECYCLE</p> <p>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.</p>		LOW	LOW MEDIUM	MEDIUM	MEDIUM	MEDIUM
<p>TOURISM "INSIGHTS" DATA COLLECTION PROGRAM</p> <p>Data collection on visitor numbers to different areas in the region 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 the region's natural environment and biodiversity.</p>		MEDIUM	MEDIUM	HIGH	HIGH	MEDIUM HIGH
<p>CONSISTENT REGULATORY STANDARDS</p> <p>Adoption of ISO or Green Key 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.</p>		VERY HIGH	VERY HIGH	HIGH	HIGH	HIGH
<p>INCREASE AWARENESS OF GUESTS AND STAFF OF SUSTAINABLE APPROACHES</p> <p>An issue highlighted during consultations was the lack of awareness on sustainability. Some guests use single-use plastic as they believe them 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.</p>						
<p>DATA AND INSIGHT SHARING AND COLLABORATION</p> <p>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.</p>						
<p>NATIONAL DATA COLLECTION FOR WATER AND ELECTRICITY</p> <p>Metering of water and electricity usage by all hotels, used to assess high usage areas and target interventions for reductions.</p>		VERY HIGH	VERY HIGH	MEDIUM	HIGH	VERY HIGH
<p>A HOLISTIC SUSTAINABLE PROCUREMENT POLICY FOR THE TOURISM SECTOR</p> <p>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 being sustainable.</p>						
<p>INCENTIVES FOR SUSTAINABLE HOSPITALITY DEVELOPMENTS</p> <p>Financial incentives for sustainable hospitality, including subsidised recycling facilities renewable energy tax credits, incentive pricing for sustainable water and energy production (e.g., solar power and treated wastewater).</p>						
<p>BENCHMARKING: MANDATE ALL FOUR- AND FIVE-STAR HOTELS TO BECOME SIGNATORIES TO THE PLEDGE ON FOOD WASTE SCHEME</p> <p>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.</p>		VERY HIGH	HIGH	VERY HIGH	VERY HIGH	HIGH

(The policies referred to with * were examined as part of the certification criteria rather than standalone policies, because they form a part of the certification process for regulatory standards)



Food and Domestic Waste

Food & Domestic Waste



Qatar is a food import dependant country with

80%

of food imported.

Food waste makes up

60%

of domestic solid waste in Qatar

KEY ACTIONS

Methane emission capture from existing landfill at Mesaieed.

Waste collection, recycling and composting facilities.

Extended producer responsibility scheme to put the cost of recycling on packaging producers.

Total Carbon emissions Savings across all proposed Food & Waste policies

estimated to total 1.3 MtCO₂e

globally each year



Whether we are looking at local production like food production in Qatar, or looking at the sustainability of the circular economy [in] the country we don't have the legislation. The regulation will make guidelines for these businesses [and] open up opportunities for others."



Net economic benefit of **QAR 2.1bn saving per year** across potential interventions identified



78,000 tonnes of waste could be prevented from going to landfill each year across all policies



Survey respondents saw waste collection and composting as the highest priority area for policy intervention in Food & Domestic waste – 95% seeing it having a positive impact for sustainability.



88% of respondents supported methane capture from landfill.

CONTEXT

Qatar imports 80% of its food. Aside from leaving the sector vulnerable to the results of external global supply chain shocks, this import dependence means Qatar relies on plastic packaging to keep food fresh during transportation and high levels of food waste due to the shorter shelf life of the imported food.[31] Qatar also has strict rules on selling food close to the expiration date and food products with damaged packaging. Some food products can only be sold up to 12 nights before their expiration and will then be removed from the shelves.[31], [32] Food with damage to its external packaging is not allowed to be sold or donated.[32]

Post-transportation, the challenge is a lack of effective and sustainable waste management infrastructure. Landfill sites release methane and other pollutants into the atmosphere and can pollute surrounding waterbodies and soil, potentially contaminating underground water resources. [33] Landfilling waste is therefore the least favourable option in the waste management hierarchy. Prevention is the best option, followed by minimisation, reuse, recycling and energy recovery.

Half of the domestic solid waste produced currently goes to landfill, and an estimated 60% of this is organic waste.[34] Treating the increasing amount of domestic solid waste (DSW) is a challenge, with an estimated 1.5kg of waste produced per person per day. [34] Consultations indicated that 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.

One of the goals of the National Development Strategy 2 (NDS2) aims to address this issue through a sustainable waste management strategy for Qatar. [3] According to the Ministry of Municipality, an Integrated National Solid Waste Management Program will include the development of policies and legislation that support waste reduction and national awareness programs and campaigns. Progress has begun with the implementation of two new waste directives announced in 2022 - the need for corporate and commercial institutions, hospitality, industrial and public stores to source segregate their waste into recyclable and residual (organic)

waste and a ban on single use or non-degradable plastic bags.[35] [36] There are also plans to expand the capacity of the domestic solid waste management centre (DSWMC) from 2,300 to 5,300 tonnes per day and include storage facilities, waste sorting and recycling facilities, an anaerobic digestion composting plant, an incineration plant, a cooling tower and substation. However, Qatar still has extensive work to do in the domestic sector.[37]

During the FIFA World Cup 2022, 80% of the waste collected from stadiums was either recycled or composted. [37] This amounted to more than 2,000 tonnes of waste being diverted from landfill. [37] It involved several initiatives before and during the tournament including the use of compostable food packaging, training for staff and volunteers, encouragement of fans to segregate their waste and providing physical sorting facilities at all stadiums. The waste segregated and sent to local recycling facilities included plastic, cardboard, food, metal, glass, and electronic waste. Composting units were placed at all stadiums to manage food waste from fans, volunteers, hospitality and staff.

OPPORTUNITIES

Acutely aware of its own reliance on food imports, Qatar has taken steps towards self-sufficiency through its National Food Security Strategy, with a goal to reach 70% self-sufficiency in the production of fresh vegetables by 2023.[39] This offers Qatar the opportunity to diversify its economy and position itself as an innovation hub for sustainable food production in the region. If properly incentivised and promoted nationwide this could reduce the current food miles and resultant emissions and excessive packaging.

In line with the National Food Security Strategy, creating a system of high-quality compost production from food waste can aid agricultural production in support of food security, create a revenue stream and reduce greenhouse gas emissions associated with landfill waste and compost imports.[38] Qatar can also harness the inherent potential of waste by creating investment opportunities in recycling, waste-to-energy technologies and materials recovery sub-sectors, which are covered further below.

POLICY INTERVENTIONS

From consultations in the first stage of work a main identified barrier to a circular transition in the waste sector was inadequate education on the environmental impact of waste disposal, alongside unsuited infrastructure to accommodate waste. In order to address these challenges, the recommended policies and interventions seek to deliver improved food waste segregation infrastructure for residencies, which should be implemented alongside a broad set of education and knowledge sharing initiatives. Another innovative proposal was the capturing of methane emissions from landfill and the use of this as a clean fuel, which in turn

could generate carbon credits. An Extended producer responsibility regulation was also identified which if implemented could mean the cost of recycling is not borne solely by the government or the general public. As was identified in consultations and research, Qatar's high dependence on imports is a major additional challenge.



WASTE COLLECTION AND BIO DIGESTING SCHEMES

The intervention that was most important to respondents during consultations was waste collection and bio digesting schemes. The proposal includes the implementation of food waste segregation infrastructure to allow all residences to segregate waste at home. There are already plans to expand the Domestic Solid Waste Management Centre in Mesaieed (DSWMC) from 2,300 to 5,300 tonnes per day. These include storage facilities, waste sorting and recycling facilities, an anaerobic digestion composting plant, an incineration plant, a cooling tower and substation. However, it is not clear what the capacity of the anaerobic digestion composting plant will be when completed. The assessment of the potential impacts has therefore been done based on the current infrastructure in place.

The collection and biodigesting of waste could have a high upfront cost, with an outlay of over QAR 132m for the waste infrastructure and upgrade of the facility. However, the net economic benefits were found to be QAR 1.3bn each year, including revenue streams from digestate fertiliser, offsets and biogas displacement of natural gas. Anaerobic digestion also provides an additional revenue stream through carbon credits from the avoided methane emissions. Baladna (Qatar's largest provider of fresh dairy) has a similar existing scheme and have partnered with the Global Carbon Council in order to sell carbon offsets. These revenue streams could act as a fund for use in continued improvements in the collection system as technical innovation progresses.

The survey results indicated that 95% of respondents either agreed or strongly agreed that implementing this policy would have a positive environmental impact on the country. Reflecting the broad support from survey respondents, interview participants highlighted that a public-sector driven roll-out of domestic recycling facilities is crucial to achieving a sustainable transition. However, they emphasised that to be most effective, this should be accompanied by an education campaign to inform residents of the benefits of waste segregation and recycling.



METHANE EMISSION CAPTURE FROM EXISTING LANDFILL.

Rapidly reducing methane emissions this decade from energy, agriculture and waste is regarded as the single most effective strategy to keep the goal of limiting warming to 1.5°C within reach and in line with the Paris Agreement.[39] Waste is the third largest source of man-made methane emissions. If captured, this methane can be used as a valuable economic and clean energy resource and reduce the sector’s significant impact on climate change.[40]

This policy intervention focuses on the capture of methane gas from the existing DSW landfill site at Mesaieed and, if implemented, could highlight the importance of installing methane capture technology to any future DSW landfill site that might be constructed in Qatar in the future. It should be noted that the existing landfill at Mesaieed will be closed and there are plans to create a new landfill site. This policy intervention also addresses the potential for methane capture to be sold as carbon offsets.

Landfill is a significant producer of methane and capturing this could both support Qatar’s methane reduction efforts as a signatory to the methane pledge and have significant economic benefits. If this policy was implemented at Mesaieed, each year emissions could be reduced by 0.013MtCO₂e and have an average net economic benefit of QAR 12.6m each year, including revenue from carbon offsets and biogas.

The survey results indicated that 88% of respondents either agreed or strongly agreed that the implementation of this policy would have a positive environmental impact in the country. Reflecting the broad support from survey respondents.

EXTENDED PRODUCER RESPONSIBILITY REGULATION



In the UK and Europe extended producer responsibility schemes have been introduced to ensure that the producers of plastic and other waste packaging are responsible for the cost of the whole lifecycle of the packaging. This includes sorting and recycling. This scheme would apply to all packaging producers, manufacturers and importers who would need to report how much packaging, and of what type, had been placed on the market.

The scheme aims to put the full net financial cost of managing household packaging waste across its whole life cycle onto producers who are best placed to influence packaging design. This means that the cost of recycling is not borne by the government or general public. There is no data on packaging businesses within Qatar so it is not possible to determine how many businesses in the country could be subject to the scheme. It is likely that the majority of the costs of the scheme in Qatar would fall on importers as there is little manufacturing within Qatar and as mentioned previously Qatar’s high dependence on imports is a major additional challenge.

The annual cost to businesses is assumed to be around QAR 518m, however this will reduce the burden on government by QAR 510m per year as the collection and processing of recycling costs will be borne by businesses. The scheme would save around 290kt of packaging waste from landfill each year with emissions savings of 0.14MtCO₂e if the packaging was used to create new products. Additionally, the scheme would create new manufacturing industry within Qatar, create jobs and enhance resource security.

CONCLUSIONS








Qatar has significant opportunities to reduce negative impacts related to food consumption and waste on the environment, economy and human health in this sector. Net economic benefits across all the policies and interventions explored were estimated to be QAR 2.1bn per year, in addition to increasing employment opportunities. Total carbon emissions savings across all the policies are estimated to be 1.3 MtCO₂e per year. Across all policies, 784,000 tonnes of waste could be prevented from going to landfill.

Alongside the interventions outlined above, other approaches were considered. The education and knowledge-sharing policy intervention was one of the most popular proposals. This would have three parts to it: 1, an awareness raising campaign on the importance of separating organic waste in homes which would be rolled out alongside the waste collection and composting scheme. A waste hub which could either be a standalone waste hub or part of a circular economy hub (outlined in the cross-cutting section above) and 3, a national food collection and redistribution programme which was seen as particularly important as food donation has dropped significantly since 2015 This scheme has the potential to provide 2kt of food to vulnerable people, and save 0.0014MtCO₂e of emissions.

Additional proposals explored included data collection carried out through the mandatory digitalisation of waste tracking. Prioritising data collection at the beginning of Qatar’s circular economy journey will enable other policies to be designed based on accurate data. A campaign to promote pride in nationally grown food was popular in the survey and a national ‘agriculture and food’ fund proved a popular policy intervention in the survey and the interviews. Incentivisation and funding for the development and roll-out of innovative technologies could enhance circular economy practices within the food and domestic waste sector and signal a move to the region becoming a leader in developing sustainable food production systems for hot, arid environments.

Lastly, an ambitious policy to deliver deforestation-free supply chains was considered. There is global political momentum to eliminate deforestation from supply chains (as seen by recent progress made in Europe), this policy would offer Qatar the opportunity to be a leader in the MENA region and build stronger relationships with Europe. In addition, it has estimated emissions savings of 0.13MtCO₂ per year and net economic benefits of QAR 119m each year. Whilst these emissions reductions would be international rather than domestic, this intervention would demonstrate Qatar’s commitment to greenhouse gas emission reductions and showcase their commitment to the global methane pledge. All the initiatives proposed can be found in Annex 2.

The interventions set out above complement one another and if implemented together could work cohesively to deliver a greater positive impact. Shifting behaviour is critical in this sector in order to make effective changes. Increased knowledge and awareness alongside other policy interventions is therefore key, and builds support for the approach. As in all sectors, data collection is also important to ensure that the effectiveness of interventions can be monitored over time and targeted interventions can be introduced. Opportunities to reduce negative impacts on the environment and human health in this sector are widespread.

POLICY	CATEGORY	ECONOMIC	ENVIRONMENTAL	HUMAN	SOCIAL	PRACTICALITY
CAPTURE METHANE EMISSIONS Scale up programmes to capture methane emissions from organic waste. Establish carbon crediting systems.		VERY HIGH	VERY HIGH	MEDIUM	MEDIUM	MEDIUM
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.		MEDIUM	HIGH	MEDIUM	MEDIUM	MEDIUM
EDUCATION AND AWARENESS CAMPAIGNS/INITIATIVES						
i. Food waste segregation and donation						
ii. Knowledge sharing Hubs to build awareness of the challenges around waste food.		LOW	VERY HIGH	HIGH	MEDIUM	HIGH
iii. Encourage initiatives to support the donation of waste food to vulnerable people. To foster the donation of surplus food in Qatar. Specifically, the charitable donation of surplus food within the retail and hospitality sectors through a national food collection programme						
REGULATED PROCUREMENT Regulate government and private procurement to ensure that there are sustainable supply chains for food.		MEDIUM	HIGH	HIGH	MEDIUM	LOW
WASTE RECYCLING AND COMPOSTING FACILITIES Expand the infrastructure for recycling and composting of organic materials. Household recycling bins required as well as industrial composting facilities which could also be used or biogas-based electricity production.		VERY HIGH	VERY HIGH	HIGH	MEDIUM	MEDIUM
CREATE/INVEST IN A NATIONAL 'INNOVATIVE AGRICULTURE AND FOOD' FUND Create a research and innovation fund (including upskilling) for innovative food and farming technologies to signal a move to the region becoming a leader in developing sustainable food production systems for hot, arid environments						
CAMPAIGN TO PROMOTE PRIDE IN NATIONALLY GROWN FOOD Make progress towards national food security by advertising and encouraging the purchase of domestically grown food to reduce carbon emissions and food waste associated with imports.		LOW	MEDIUM	MEDIUM	HIGH	HIGH
EXTENDED PRODUCER RESPONSIBILITY REGULATION To put the full net financial cost of managing household packaging waste across its whole life cycle onto producers who are best placed to influence packaging design.		HIGH	HIGH	MEDIUM	MEDIUM	MEDIUM

The Built Environment



You have to consider the whole lifecycle of a building from its construction to its deconstruction, if you want to develop a building in a sustainable manner.

ANONYMOUS STAKEHOLDER
IN THE CONSTRUCTION SECTOR



Built Environment



Construction & manufacturing are responsible for circa

17% of Qatar's total carbon emissions

KEY ACTIONS

Increasing the proportion of recycled aggregate in construction.

Energy Performance certification for existing buildings.

Adopting green government procurement standards.

Across all proposed built environment policies estimated to

total QAR 247m saving

globally each year



You have to consider the whole lifecycle of a building from the construction to the deconstruction to develop a building in a sustainable manner"



Total Carbon emissions Savings across all proposed Built Environment policies estimated to total

0.1 MtCO₂e
globally each year

1 Survey respondents identified that a sustainable business strategy and mandatory global sustainability assessment certifications such as LEED were the highest priority areas.

2 Targeting the LEED rating system and Energy Performance systems mandatory have been identified by impact assessments as those with most significant impact. Recycled aggregate usage also deemed an important innovation.

CONTEXT

After energy, construction is Qatar's second largest industry. It accounts for 12% of Qatar's GDP ^[41]. Events such as the FIFA World Cup have increased demand for construction in Qatar, and the construction market is expected to reach \$76.98bn by 2026. ^[42]

The hot, arid climate of Qatar and the MENA region poses unique challenges for the built environment, with two thirds of electricity from the housing sector being used for cooling. Despite these challenges, Qatar has made significant strides in improving the sustainability of the built environment. In 2005, Qatar introduced enhanced environmental regulations that mandated that new projects gain environmental clearance from the Supreme Council for Environment and Natural Reserves and conduct an environmental impact assessment. ^[43] Qatar's Second NDS 2018-2022 set a target to ensure that at least 20% of materials used for construction were recycled sources by 2022. ^[3] In 2019, over 50 projects were certified under the Global Sustainability Assessment System (GSAS). ^[3]

An integrated approach that addresses the whole life cycle of a building is imperative. This approach is exemplified by the sustainability standards that Qatar applied to the infrastructural development of the FIFA World Cup 2022, where it deployed circular practices such as diverting 70-80% of waste from construction, reusing shipping containers to build stadiums, and repurposing building materials after the event. ^[44] Successful initiatives also extend to the residential sector, such as Qatar's first smart city, Lusail. Lusail is designed to reduce energy consumption through various initiatives including a pneumatic waste collection system, a sewage treatment plant and an interconnected natural gas network. ^[45] While significant progress has already been made in this sector, opportunities for further progress remain.

OPPORTUNITIES

Retrofitted buildings can reduce heating and cooling energy requirements by 50-90%, whereas new, energy-efficient buildings often use close to zero energy for heating and cooling. ^[46]

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 climate challenges. Greater innovation in the built environment would also enable the adoption of innovative technologies, such as low-energy intensive cooling and water production systems.

POLICY INTERVENTIONS

Together, the following policies deliver a holistic set of interventions to improve the sustainability of all buildings, from construction to demolition. These measures seek to address public sector buildings, existing domestic buildings, future buildings, construction materials and consumer behaviour.

During initial consultations, one significant challenge identified was the "siloeing" of policy areas. About 30% of respondents noted that rather than coherent national planning, most advancements in Qatar have been reached through isolated projects. While significant achievements have been made around the sustainability of large-scale projects, 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.



GSAS is mandatory for a lot of construction. The metro project was one of the first projects in Qatar which applied GSAS. Many official buildings were developed based on LEED. But the largest sector of the construction is not the metro nor the official buildings; it's the residential and private buildings whose landlords don't apply LEED or GSAS, at least not yet. This is where policy needs to come in.

ANONYMOUS STAKEHOLDER IN THE CONSTRUCTION SECTOR



LEADERSHIP IN ENERGY AND ENVIRONMENTAL DESIGN (LEED)

Qatar has already made significant progress in building Leadership in Energy and Environmental Design (LEED) and Global Sustainability Assessment System (GSAS) certified buildings, with 404 projects gaining GSAS certification between 2010-2020. ^[3] However, one expert stakeholder noted that uptake in the residential sector remains low. This highlights the need for these standards to be made mandatory in order to boost uptake across domestic and non-domestic construction projects. A targeted push from the government can drive progress across the private and domestic sector. A regulation requiring all new buildings to meet LEED green building standards could save 0.15MtCO_{2e} per year in addition to an annual saving of 6.8 million m³ of water. Implementation of this policy is anticipated to cost QAR 1.9 billion per year whilst bringing about annual savings of QAR 3.7bn. Furthermore, living in LEED or GSAS certified buildings has been proven to deliver health benefits as a result of improved ventilation, in addition to increasing social well-being from higher living standards ^[7].



ENERGY PERFORMANCE CERTIFICATES

Another regulatory approach explored was mandatory energy performance certificates (EPC). EPCs provide information about the energy efficiency of homes, alongside guidance about measures that can be taken by residents to reduce energy consumption. This policy was strongly supported in consultations. In Europe, EPCs have been highly successful as part of a package of measures to target the sustainability of the building sector. ^[47] Findings from European case studies, and supported by the impact assessment in the Qatar context, suggest that EPCs are unlikely to result in significant emissions savings through awareness raising alone due to low energy bills in Qatar. They need to be accompanied by a tightening of restrictions e.g., minimum EPC rating requirements for landlords. If EPCs were to be made mandatory it is recommended that this policy is supported by additional policy interventions such as charging residents for domestic electricity usage. This was also proposed by respondents in the previous consultations. Should EPCs be implemented alongside supporting policies such as charging for electricity usage, this policy could save 0.006MtCO_{2e} and 330GWh in energy savings. The net economic benefit each year was found to be QAR 10m.



SCALE UP AGGREGATE RECYCLING FACILITIES

The policies above are broad and ambitious, aiming to address sustainability across all aspects of a building's lifecycle. However, more targeted policies such as increasing the proportion of recycled aggregate can also lead to significant carbon and economic savings. Qatar's NDS identifies that increasing the proportion of recycled aggregate offers significant opportunities for increasing the sustainability of the buildings sector. ^[3] However, there is an absence of regulation that obliges foreign companies to purchase a certain percentage of construction raw materials such as recycled aggregate from the domestic market. Developing Qatar's recycled aggregate capacity provides the opportunity to become a leader in recycled construction products in the MENA region and enables a diversification and future-proofing of jobs within the industry. Reducing reliance on imported virgin aggregate has the potential to reduce annual carbon emissions by 0.009 MtCO_{2e} and water consumption by 40,000m³ per year. ^[135] Whilst this policy has high upfront costs, its net economic benefits are estimated to be about QAR 6m each year.

CONCLUSIONS

This sector has widespread opportunities to reduce negative impacts on the environment and human health. Net economic benefits across all the policies and interventions explored were estimated to be QAR 3.8bn each year, in addition to increased employment opportunities. Total carbon emissions savings across all the policies are estimated to be 0.27MtCO_{2e} per year.

Alongside the proposals set out above, additional interventions were explored, all the proposals can be found in Annex 2. The intervention found to be least impactful was

a consumer engagement campaign to encourage Qatari residents to make more sustainable choices in their homes, such as turning off the air-conditioning when they are out. Consultations identified the value of this policy for increasing public awareness of sustainability. However, considering residents are not charged for utility bills and the relatively low success rates of consumer engagement campaigns, we estimate that this policy would have limited success. While we did not consider this policy to be an effective standalone intervention, Qatar could use consumer engagement campaigns to support other policies, such as mandatory






EPCs and LEED certifications, to realise maximum environmental and economic benefits.

We identified additional policies that overlap with the abovementioned policies but did not consider them to be standalone interventions.

These included tax incentives for local products and the use of technology and innovation.

An important challenge raised throughout consultations was the absence of government regulation. Both the interviews and survey

results indicated that respondents believe public sector-led legislation is key to the wider uptake of circular economy practices. The policy interventions we found to be most impactful were more interventionist approaches that rely on government regulation. The consultations also highlighted that Qatar could achieve a holistic approach by developing a “Sustainable Buildings Strategy”. These strategies have been highly effective in other jurisdictions, such as Europe and the UK, in setting direction and creating certainty in the policy landscape for businesses.

POLICY	CATEGORY	ECONOMIC	ENVIRONMENTAL	HUMAN	SOCIAL	PRACTICALITY
Energy Performance Certificate (EPC) regulation A regulation requiring all buildings 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.		MEDIUM	HIGH	HIGH	HIGH	MEDIUM
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.		HIGH	HIGH	HIGH	HIGH	HIGH
Consumer behaviour shift Data collection, reporting and benchmarking to inform education and awareness around sustainability to shift consumer behaviours e.g., closing doors when the air conditioning is on.		HIGH	HIGH	MEDIUM	MEDIUM	MEDIUM
Benchmarking The government, as a large property owner, can transform building standards through setting minimum sustainability standards for all its rented and owned buildings.		LOW	MEDIUM	HIGH	HIGH	VERY LOW
Mandatory GSAS/LEED Green Building certification for all new buildings Regulation that mandates all new buildings in to gain GSAS or LEED green building 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.		LOW	VERY HIGH	VERY HIGH	VERY HIGH	MEDIUM

Discussion



It's about awareness, education and policy.

ANONYMOUS EXPERT INTERVIEWED

This report analyses data from European impact assessments, academic research, surveys and interviews to propose policy frameworks and initiatives that Qatar could further develop. These frameworks and initiatives have the highest predicted net benefit across the three pillars of sustainability and are suited to the context of Qatar and other arid countries.

POLICY PRIORITIES

This work reflects the views and values of Qatar's most pre-eminent policy experts, scholars and industry professionals. It is supported by quantitative evidence from best-in-class global examples, carefully translated to the context of Qatar and building on the already impressive array of sustainability policies in force.

Overwhelmingly, the most effective and popular policies were top-down legislative interventions, illustrating the desire for strong leadership to drive sustainable development. Strategic commitment will be a vital part of this. The cornerstone of a successful transition should be a comprehensive "Green Growth Plan" to consolidate disparate policy strands and set a clear roadmap for delivery of the Qatar National Vision 2030 (QNV), the National Development Strategy 2 (NDS) and the National Environment and Climate Strategy.

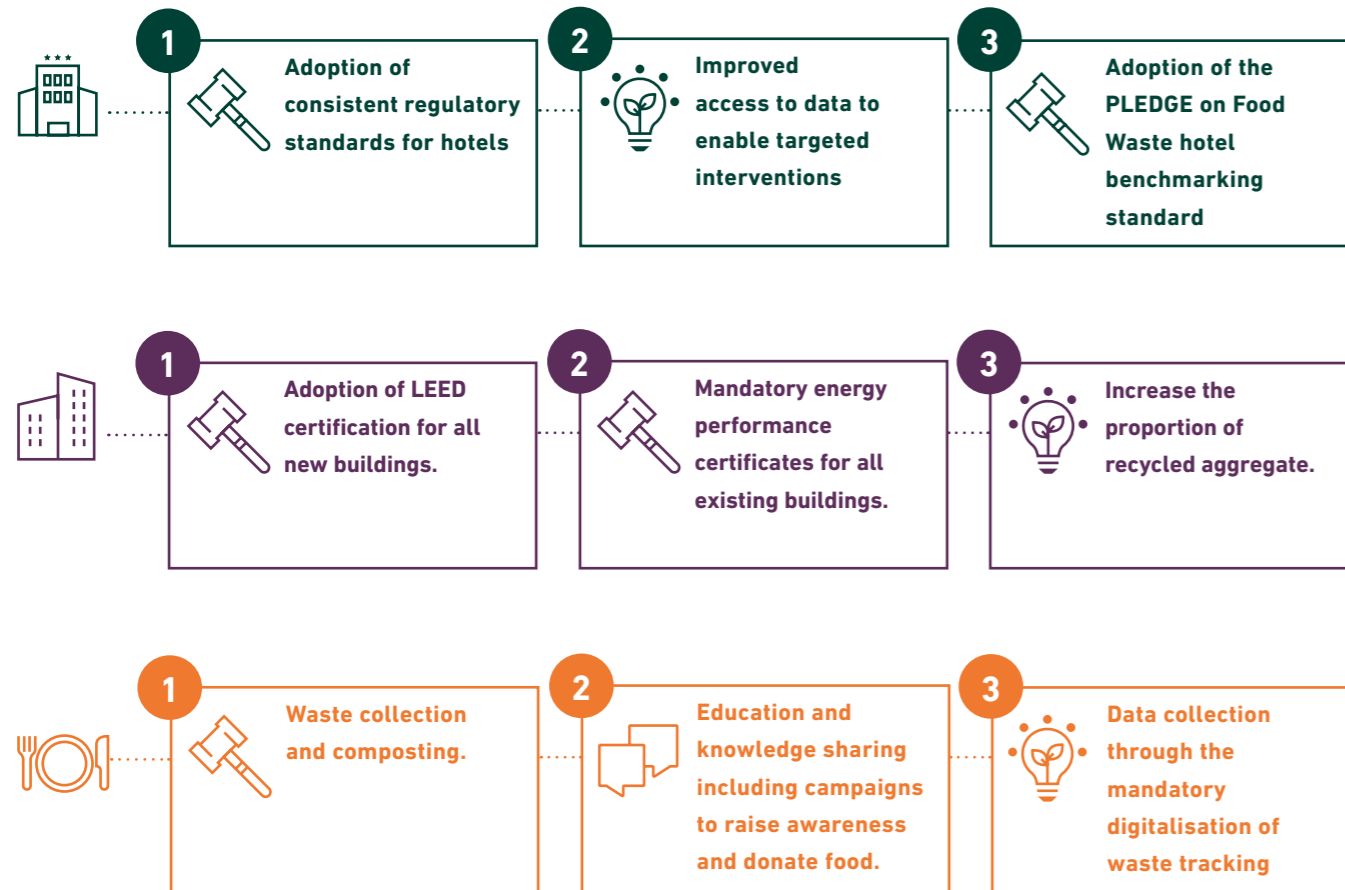
Alongside these legislative "sticks", education and incentivisation were seen as important, even vital, "carrots". Indeed, when designing policies at a consumer level, encouraging behaviour shift is an essential and proactive step towards building circularity, but evidence shows that awareness alone results in limited impact. This is at least true if there is no

incentivisation, either legislative- or reward-based. The desire for strong public-private partnerships to deliver a circular economy was evident. Our consultations highlighted that businesses in Qatar are ready to drive sustainable practices, and where the government has championed sustainability initiatives, businesses have enthusiastically implemented them. For example, the plastic bag ban in grocery stores in 2022 led to a huge uptick in the use of biodegradable bags, and Monoprix now has a single-use carrier bag charge.^[36] The desire from businesses for the government to raise ambition across the board, especially towards reducing waste to landfills, has been vocalised, and there have been several calls for a complete ban on single-use plastics.

Respondents from the consultations had a strong belief that the majority of interventions proposed would positively impact the environment and economy, and all the policies could be integrated into Qatar, an arid country with strong Islamic and cultural values. It is clear, then, that expert stakeholders are ready and willing to work towards creating a thriving future for Qatar but require a strong top-down legislative structure to do so.

Below are the top three interventions across the three sectors. Policies have been categorised into four levers: financial, legislative, enabling and educational/awareness-raising. The impact assessments and the consultations found all four levers to be cost-efficient ways of improving the circularity and sustainability of the Qatari economy while providing essential contributions to the four pillars of the QNV 2030.

TOP 3 INTERVENTIONS ACROSS THE 3 SECTORS



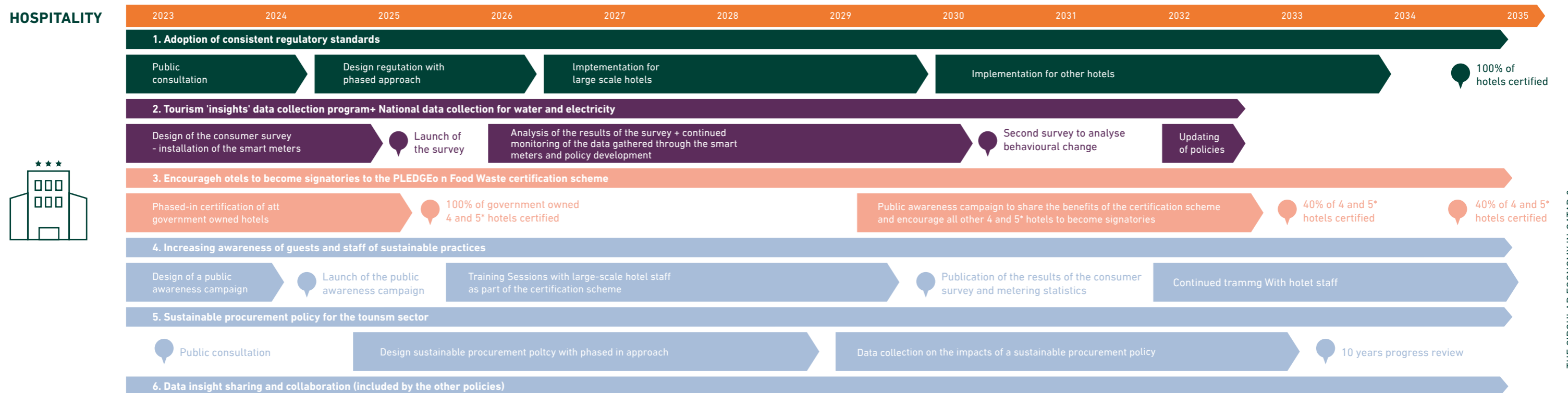
Across all three sectors examined in this report, the impact assessments and the surveys found legislative policy interventions to have the greatest positive impact on the environment, with some of the lowest costs. Additionally, some of the most impactful policies included the adoption of consistent regulatory standards for hospitality, the implementation of consistent benchmarking standards for the built environment and the enforcement of consistent recycling and composting for domestic waste and food. However, as emphasised in earlier consultations, enforcement will be important to ensure that these policies succeed. This will add additional administrative burdens and costs, which we have not quantified as part of this assessment.

in practice for most of the policy interventions recommended in this report, which will equal more than the sum of their parts when used with others. In this regard, consultation respondents considered the use of technology and other innovations and enablers as particularly impactful, and even more so when paired with other policies, as is the case for methane capture technologies or waste tracking and energy and water consumption metering. While the consultations found the use of financial incentives to be potentially impactful, Qatar's economic and social context makes such impacts harder to assess and quantify.

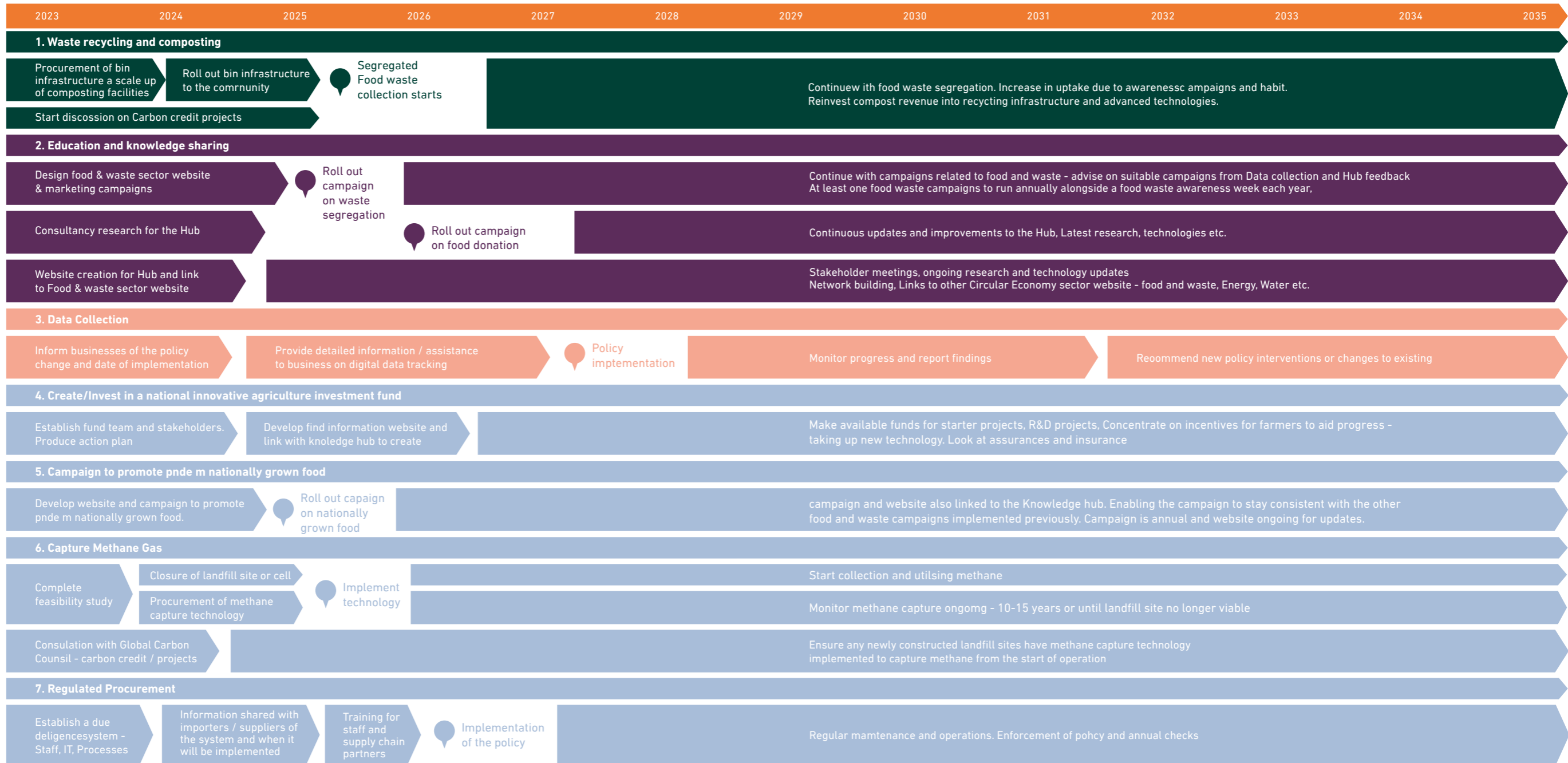
The impact assessments and the surveys also found awareness-raising and education to be effective instruments for achieving greater circularity. Such measures will likely have a minimal concrete impact on the environment through emissions reduction or resource savings. However, they can be extremely successful when paired with legislative and enabling interventions. This will be the case

Qatar has a world-class education system and hosts several notable universities. The creation of a MENA Circular Economy knowledge hub that hosts specific industry sectors integral to building a circular economy would provide the opportunity to convene stakeholders and be a central point for research, innovation and awareness. This would showcase Qatar as a leading information centre in progressions towards a circular economy and address the need for a cross-cutting approach to sustainable policy and practice.

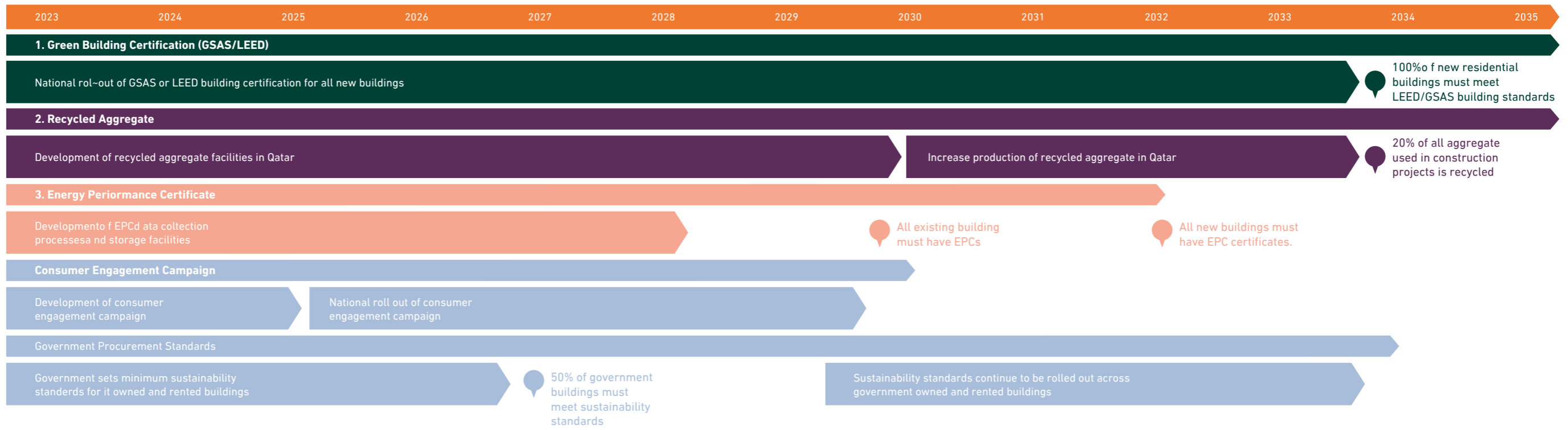
Timeline for delivery of the policies with key performance indicators (KPIs).



FOOD AND DOMESTIC WASTE



THE BUILT ENVIRONMENT



Conclusions

Circularity is important for the entire economy, and the widespread opportunities are ripe for the taking. However, for Qatar, verve and ingenuity alone will not deliver the transition. There is a need to thread Islamic and social values throughout the new economic and environmental system. Policies must be developed in a proper manner, whereby values relate to actions and vice versa.

CREATING A LONG-TERM SYSTEM LEVEL CHANGE

Qatar and the MENA region have diverse economic and environmental conditions, and no single policy intervention can facilitate a transition to a circular economy. The opportunity must be approached as a package of interventions that work together. Below are the five action points needed to develop and implement this package. They frame the findings of this work and underline the holistic approach that can facilitate success.

1

TAKE A SYSTEM-WIDE APPROACH



A circular economy is built on healthy local, national and international habits.

EXPERT SURVEY RESPONDENT

Working in discrete units is not a recipe for transformative system change. There is a need to communicate, collaborate and integrate not just across government, but across society as a whole. Many of these policies will not work in isolation and should be designed and delivered in tandem. For example, composting infrastructure should be accompanied by an education campaign to ensure maximum buy-in and adoption by the domestic population. Mandatory EPCs provide information on current performance, but knowledge is only the first part of the journey. The opportunity for increased dividends comes from using this information to design policies that incentivise the uptake of these bespoke sustainable technologies across the sector.

2

CREATE A ROBUST LEGISLATIVE FRAMEWORK FOR CHANGE



Clear-cut guides and regulations should be put in place to make [the circular economy] a realisation

EXPERT SURVEY RESPONDENT

Across the board, legislative approaches were considered the most necessary and impactful. Steering the private sector and the population towards circular approaches by mandating a transition to sustainable technologies and approaches is undoubtedly the place to start. Experts note that profit-driven companies are unlikely to implement new technologies if they do not see a market need. For many of the proposed interventions there is no legislation or regulation on which to base guidelines for existing businesses, or open up opportunities for new businesses. Additionally, individuals will struggle to take domestic action unless provided with the infrastructure and guidance to do so. Legislation across the three focus sectors and beyond is vital to set the right operating space for a profitable and holistic transition.

3

INTEGRATE CIRCULAR ECONOMY STRATEGY INTO QATAR'S FDI STRATEGY



In the last two years, we have participated in nationally run research initiatives and have been able to develop a feasible greenhouse model that allows us to produce vegetables round the year.

NASSER AL KHALAF, AGRICO

Central to the development of many of the policies is the potential of technology and innovation. Experts surveyed agreed that using new technologies, such as precast concrete for construction, AI guest management systems in hotels and vertical farming for food production would significantly benefit the environment and economy. The challenge comes from developing and implementing such technologies. This highlights a need for further international inward investments and flows of domestic finance, making use of Qatar's free zones and forward-thinking ethos. Sending a signal to the market that Qatar is ready and willing to be the innovation hub of the Middle East and beyond could secure this, further solidifying the drive for economic diversification in the process.

4

COLLECT AND USE DATA TO INFORM POLICY



There is a culture of not having data available here. Any kind of data collection is good, as long as it has a home and an impact.

ANONYMOUS GOVERNMENT EXPERT INTERVIEWED

The importance of a strong evidence base for policymaking is widely accepted. Initial consultations identified the paucity of publicly available data in Qatar, which hinders progress towards circularity. Collecting data to understand the baseline is a key first step in addressing this. As demonstrated through this work, having accurate and comparable data has aided in developing a compelling case for the circular economy. If Qatar initiates a systematic data collection programme, it can establish baselines, measure and showcase progress, and create and monitor robust policies.

5

EDUCATE FOR CONSUMER AND CITIZEN AWARENESS



We can only sell what the people accept

ANONYMOUS EXPERT INTERVIEWED FROM THE CONSTRUCTION SECTOR

One of the main barriers identified was the lack of awareness of sustainable initiatives, laws and incentives already in place and in the pipeline. Awareness and behavioural change is one of the most important aspects of a transition to a new system, and can be the difference between success and failure.

To ensure widespread awareness, avoid a piecemeal approach and tie together the strands of the above recommendations, there is a need for a central digital hub to host all things circular economy in Qatar. The hub would provide a resource for the population of Qatar responsible for the day-to-day implementation of these responsibilities and signpost the exemplary, cross-cutting and visionary work Qatar is doing worldwide. It will also boost Qatar's competitiveness by showcasing government, business and individual action, in turn helping to create new links and business opportunities. Setting up and running a knowledge hub would have relatively low costs and substantial benefits in terms of raising awareness within the region for circular economy issues, addressing one of the barriers and turning it into a key lever for change.

Next Steps

LIFE CYCLE ANALYSIS

This project has demonstrated the myriad benefits made possible by a transition to a circular economy. Through bold, innovative political leadership and a concerted national effort, Qatar can and will realise these benefits. To set out a transition roadmap for the entire domestic economy and a detailed, data-driven implementation plan, the next stage of work will involve a full-scale life cycle assessment (LCA) covering Qatar's entire domestic economy.

LCA is an environmental management tool used to evaluate the impact of a product, system or process. It has constantly evolved since its conception in 1969 and considers environmental, social and economic impacts, following the three pillars of sustainability.^[48]

These standards provide guidance on defining goal and scope, systems boundaries, functional units, and data sourcing and use. They also help rationalise complex systems and ensure a transparent, uniform approach.

Applying LCA to building materials, buildings and infrastructure and their function is well established in LCA communities. However, expanding LCA to a wider, top-down system (e.g., a town or city, urban region or country) is a major challenge that is only recently being addressed.^[49] The next stage of work will take on this challenge to develop a country based LCA for Qatar. To our knowledge, this is the first country-level LCA that has been conducted.

FINAL REPORT

The results of the work to date and the LCA will be used to produce a paper which sets out evidence based, detailed policy recommendations to support Qatar and other countries in the wider MENA region to diversify their economies and build a sustainable, circular economy.



Appendix 1: Survey and Interview Data

A targeted survey of stakeholders in Qatar and the broader Middle East & North Africa (MENA) region was conducted between January and February 2023 to seek expert views on the circular pathways and interventions identified in the first stage of work and their relevance in the Qatari and MENA context. Respondents were asked to provide views on how the policy interventions can align with and support the Qatar National Vision 2030 (QNV) and Islamic values and priorities. The survey yielded a total of 100 respondents. Of these, 72% had moderate to significant knowledge of the circular economy.

SURVEY TRENDS

HOSPITALITY

Over 50% of respondents agreed that financial incentives for recycling would be one of the most important policies to roll out in the field of hospitality. This was followed by consistent regulatory standards and increased awareness of guests and staff on sustainable approaches.

A majority of respondents (over 90%) felt that the recommended policies would have a positive impact on sustainability in Qatar, and over 82% felt they would have a positive impact on the economy, but between 8-20% of respondents felt they would be difficult to implement. At least 70% of respondents also felt that these policies would be suitable for other countries with hot and arid climates.

FOOD AND DOMESTIC WASTE

Over 50% of respondents agreed that waste recycling and composting facilities is the most important policy in the food and domestic waste sector. This was followed by education and knowledge sharing initiatives, and investment in a national 'innovation and agriculture and food' fund.

A majority of respondents (over 87%) felt that the recommended policies would have a positive impact on sustainability in Qatar, and over 75% felt they would have a positive impact on the economy, but between 8-23% felt they would be difficult to implement. At least 67% of respondents also felt that these policies would be suitable for other countries with hot and arid climates.

CONSTRUCTION

Over 50% of respondents agreed that sustainable buildings strategy was the most important policy in the food and domestic waste sector. This was followed by mandatory Global Sustainability Assessment System certification for new buildings, and regulation for sustainable government procurement standards.

Majority of respondents (over 85%) felt that the recommended policies would have a positive impact on sustainability in Qatar, and over 81% felt they would have a positive impact on the economy, but between 8-15% felt they would be difficult to implement. At least 70% of respondents also felt that these policies would be suitable for other countries with hot and arid climates.

INTERVIEWS

A series of targeted in-depth interviews with 12 key policymakers, academics and stakeholders in Qatar were conducted between January and February 2023 in order to test the specific ideas and policy recommendations developed. The interviews were focused on gathering feedback from those who would be responsible for implementing the policy recommendations identified in the report, including Kahramaa, Qatar Tourism, Ashghal, and Islamic environmental organisations.

TRENDS

Almost all the interviewees pointed out that education and awareness were the primary factors in promoting sustainability, circular economy practices. Examples included lack of awareness of laws or policies. This underpins the need for awareness campaigns and educational hubs as mandatory supplements to policy roll outs to encourage behaviour change at a societal level.

INTERVIEW QUESTIONS

Terms of the session:

- We abide by the Market Research Society Code of Conduct.
- All comments are treated confidentially and will not be attributed in the report, unless you request to be quoted.
- We will not pass on your personal data to any third parties.
- We will record the session for internal use to ensure we capture everything.
- We will talk for no more than 45 minutes.

- 1 Can I start by asking a little about your organisation and role, as well as any other background that might be helpful context?
- 2 From your perspective what are the main opportunities and challenges in relation to Qatar's future development? (You can mention different industries, global context, touch on Qatar's vision and its sectors)
- 3 Where do you think sustainability ranks in importance and priority on that 'list'?
- 4 Before we explore the topic in greater depth, what comes to mind when you think of the circular economy. How would you define a circular economy?
- 5 How important do you think it is for Qatar to move towards this model and why?
- 6 In relation to your area of expertise/ role, I wanted to get your thoughts on some of our suggested policy recommendations. In particular to get a sense of whether you think these would be practical and effective in Qatar and other arid countries.

BUILT ENVIRONMENT

a. Sustainable buildings strategy

A strategy setting out the government's approach to improving circularity and sustainability from construction to decommissioning of buildings and key performance indicators

b. 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.

c. Construction Products Regulation

Regulation to introduce unified standards for each product within the construction sector including on environmental and safety.

d. Energy Performance Certificate (EPC) regulation

A regulation requiring all buildings 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.

e. 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.

f. Consumer behaviour shift

Data collection, reporting and benchmarking to inform education and awareness around sustainability to shift consumer behaviours e.g., closing doors when the air conditioning is on.

g. 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.

h. Mandatory Global Sustainability Assessment System (GSAS) 'Design and Build' certification for all new buildings

Regulation that mandates all new buildings in to gain 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.

7 We have identified several data gaps in relation to the construction sector. It would be helpful to talk through these gaps now, and if necessary, follow up via email to fill them.

- a. GDP of construction sector (which matches defined scope of the report)
- b. Emissions of Qatar construction sector, broken up by construction, demolition and materials
- c. Tonnes of different materials used in construction in Qatar
- d. Tonnes of construction waste which get recycled
- e. Tonnes of construction waste which go to landfill
- f. Emissions reduction associated with building more efficient buildings
- g. Emissions associated with Qatar World Cup
- h. Any data on further environmental impacts of construction sector such as pollution and chemicals leaching
- i. Sectoral breakdown of what in aspects of construction are least/ most environmentally friendly (ex. Concrete vs wood)
- j. Data from eco-hotels/ any case studies in arid countries which have developed eco-buildings
- k. Data of raw materials supply chains
- l. Details on what materials can be recycled in Qatar

FOOD AND DOMESTIC WASTE

a. Capture methane emissions

Scale up programmes to capture methane emissions from organic waste. Establish carbon crediting systems.

b. 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.

c. 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.

d. Education and knowledge sharing initiatives

Knowledge sharing hubs to build awareness of the challenges around waste food.

e. 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.

f. Create/invest in a national 'innovative agriculture and food' fund

Create a research and innovation fund (including upskilling) for innovative food and farming technologies to signal a move to the region becoming a leader in developing sustainable food production systems for hot, arid environments

g. Campaign to promote pride in nationally grown food

Make progress towards national food security by advertising and encouraging the purchase of domestically grown food to reduce carbon emissions and food waste associated with imports.

h. Regulated procurement

Regulate government and private procurement to ensure that there are sustainable supply chains for food.

i. Waste recycling and composting facilities
Expand the infrastructure for recycling and composting of organic materials. Household recycling bins required as well as industrial composting facilities which could also be used or biogas-based electricity production.

8 We have identified several data gaps in relation to food and domestic waste. It would be helpful to talk through these gaps now, and if necessary, follow up via email to fill them.

a. GDP of waste sector (broken down by type of waste) (and as percentage of Qatar overall GDP)

b. Emissions from waste sector (broken down into different GHGs) (and as a percentage of Qatar overall emissions)

c. Tonnes of waste in Qatar (broken down by waste type)

d. Breakdown of how waste is treated (% recycled, % in landfill, % incineration, % compost)

e. Emissions associated with different waste treatment options (ex. How much more emissions does landfill produce in comparison to incineration per tonne of waste)

f. Sectoral breakdown of what sectors produce the most waste (construction, domestic etc)

g. GDP of agriculture sector (and as percentage of Qatar overall GDP)

h. Emissions quantification of Qatar agriculture sector (and as a percentage of Qatar overall emissions).

i. % self-sufficiency of different food products – available for some but not all products

j. Current agricultural practices (type, use of chemicals, circularity of process) - including quantification of how much pesticides are used in Qatar- to what extent does Qatar engage in organic/agroecological farming methods? How engaged is Qatar in the innovative agriculture space? Feasibility studies for aquaponics, vertical farming and other innovative agricultural systems suited to Qatar?

k. Research on climate-adaptive agriculture in arid lands (current research gap)

l. Any data on further environmental impacts of the waste/agriculture sector (ex. Water pollution as a result of waste, soil health, air pollution, destruction of ecosystems as a result of degradation from pollution).

m. Results from 'Unwasted' and behaviour change campaigns to reduce waste]

HOSPITALITY

a. 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.

b. Tourism 'insights' data collection program

Data collection on visitor numbers to different areas in the region 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 the region's natural environment and biodiversity.

c. 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.

d. 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.

e. National data collection for water and electricity

Metering of water and electricity usage by all hotels, used to assess high usage areas and target interventions for reductions.

f. 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 being sustainable.

g. 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).

9 We have identified several data gaps in relation to the hospitality sector. It would be helpful to follow up via email to fill them.

a. GDP of hospitality sector (matching scope of the report) (and as percentage of Qatar overall GDP)

b. GHG emissions from hospitality sector (breakdown of different GHGs eg. CO2 Methane etc). (and as a percentage of Qatar overall emissions). We need to make sure this aligns with definition of hospitality as defined in the report.

c. Data on Qatar FIFA World Cup- emissions, tourists, revenue etc.

d. Number of hotels in Qatar

e. Average emissions per hotel room

f. Emissions from eco-hotels in comparison to traditional hotels

g. Data on further environmental impacts linked with hospitality sector (ex. Chemicals, waste, impact of littering, destruction of ecosystems, water use)

h. Any case studies (and their effectiveness) from Qatar on hotels which have addressed circularity via practices such as: sourcing food locally, composting, sending food waste to farms as compost/animal feed, using roof gardens for food production, reduction in cleaning chemicals etc).

i. Water usage and waste recycling data

j. Visitor numbers to different areas in Qatar and/or different holiday 'types' e.g., specific data on tourist appetite for ecotourism vs traditional tourism.

ISLAMIC VALUES

10 In relation to your area of expertise/ role, I wanted to get your thoughts on the Islamic perspective on the circular economy in three focus areas 1) food and domestic waste 2) construction 3) hospitality

a. What do sources of Islamic jurisprudence (Quran, Sunnah, Ijma) say about sustainability in these areas? Can you quote any verses etc that provide guidance on these three areas?

b. What Islamic guidelines should policymakers bear in mind when they approach these sectors? (Eg harmonising the built environment with nature? Approach to food waste).

c. Can you think of examples in the 'Islamic World' or generally some that are aligned with these guidelines and can act as practical application of Islamic principles in the three sector?

EDUCATION

11 Is there a national focus on inculcating sustainability and its principles on the schooling level? Further to that, has the MOEHE collected data on behaviour change in students when it comes to recycling, protecting the environment, and being mindful of resources?

INTERVIEW TRENDS

M. "It is about awareness, it is about education, and it is about policy."

N. Education and awareness

O. Almost all the interviewees pointed out that education and awareness were key to the success of enforcing sustainability and circular economy practices. In some cases, where laws and policies do exist, for instance on waste segregation, composting, or fines on excess use of water, civil society may be slow to adapt as it is not brought amply to its attention. Some examples that were pointed out included lack of publicly available information on sustainability initiatives, lack of education on the importance of composting or the need to save potable water, or improper use of waste segregation and recycling bins. This underpins the need for awareness campaigns and educational hubs as mandatory supplements to policy roll outs as they will be crucial in encouraging behaviour change at a societal level. Moreover, this can enable a multiplier effect, whereby demands for environmentally friendly practices by civil society can force various sectors to implement or comply with sustainable practices.

P. Data collection

Q. Another running theme between interviewees was the importance of the collection of and access to data. Representatives from the three main sectors pointed out that there were insufficient processes in place to capture data, or where data had been captured, it was not always made publicly available. This hampers knowledge-sharing and reporting for all stakeholders when it comes to sustainable. A focus on systemic data collection and publishing can help all sectors with goal setting for emissions reduction.

R. Monitoring and implementation

S. Interviewees pointed out while certain standards and sustainability practices were being followed, they may not be mandated across sectors. GSAS or LEED certification for sustainable buildings are adhered to by government-run construction companies but may not be enforced in privately-owned companies. Another example is waste segregation policy roll-out for the commercial sector; however, the widespread implementation of this policy has not yet been seen. Therefore, in the case where best practices, policies, or innovative solutions exist, there needs to equally be a focus on mandating them across sectors and following up with regular checks and balances to ensure compliance.

Appendix 2: Impact Assessments

Impact assessments have been conducted for each of the policy interventions developed in the first report to assess their viability. Impact assessments and case studies for the MENA region do not yet exist for the suggested policy interventions, impact assessments have been based on global examples of similar interventions and the impacts have been transposed to the Qatar context using available evidence and assumptions.

The impact criteria for each policy intervention is based on a) the Qatar National Vision, b) the 3 pillars of sustainability^[48] and c) the key criteria areas set out in the Ellen MacArthur Foundation's report^[9] on the economic case for moving to a circular economy in Europe.

CROSS-CUTTING POLICIES

Knowledge-sharing hub

POLICY DESCRIPTION

One of the key challenges identified across surveys and interviews was a lack of awareness of the support available and of the existing sustainability measures in place across Qatar. This challenge cuts across all the sectors explored in this report. In other countries, a circular economy knowledge hub has been found to be an effective way of sharing lessons learned, case studies and sources of support. This knowledge hub could be hosted by Earthna.

POLICY AIMS, OBJECTIVES AND INTENDED EFFECTS

In Europe, a knowledge hub was introduced by the European Economic and Social Committee (EESC) to support the implementation of the Circular Economy Action Plan through increasing stakeholder engagement. [50] The platform was intended as a “network of networks” that went beyond sectoral activities to highlight cross-sectoral opportunities and challenges. It contributes to disseminating information on the circular economy at a national and local level and makes information more easily accessible.

Based on the European model, this policy initiative would be the first of its kind in the Middle East & North Africa (MENA) region and position Qatar at the heart of the discussion on the circular economy.

A website could be provided as a one-stop shop for knowledge on the circular economy in the MENA region, with a particular focus on Qatar. The website would provide details on the actions being considered/taken and provide the basis for all actions taken, including alignment to Islamic values. This would also act as an online meeting place for stakeholders to exchange ideas through webinars, Q&A sessions and expert discussions. The website would be interactive and accessible, and available in both English and Arabic.

As part of the European platform, the EESC and EU commission host an annual two-day conference on the circular economy with businesses, trade unions, civil society organisations and public authorities. [50] Earthna already hosts annual sustainability conferences, which would complement the online platform in providing another route for engagement to promote the knowledge hub.

The secretariat's role will oversee the maintenance of the website, provide support to the contact group and be responsible for social media. The secretariat will also support the publication of documents, facilitate the convening of partners and support the delivery of events and engagement.

The contact group would be made up of volunteers from key stakeholder groups and experts. These could include trade associations, business groups, academics, governments and civil society. They would be ambassadors of the platform and encourage the broader community to engage with it, including through encouraging existing platforms and initiatives to engage. The contact group's role would also be to encourage debate around the challenges and opportunities for a circular economy in the MENA region and Qatar.

POLICY ANALYSIS

Setting up and running a knowledge hub would have relatively low costs and could reap substantial benefits in terms of raising awareness within the region for circular economy issues. The hub could support broader outreach to both the public and experts in the region and would complement sustainability workshops.

The impact assessment has been based on information available on the European platform and other education and awareness programmes. The impacts have been assessed for the MENA region as a whole, given the potential reach of the site, where policy assessments for the other interventions are for just Qatar.

IMPACT ASSESSMENT

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
ECONOMIC DEVELOPMENT			
STAFF	QAR1.6m per year		This impact assessment assumes the cost of 5 staff members to run the secretariat. Estimated Qatar salary of staff member is QAR 27,000/month x 12 months x 5 staff = QAR 1.62m per year. ^[65]
WEBSITE	130,000 - 180,000 QAR for website 5,000 QAR per year for website maintenance		£30,000-40,000 set up costs for additional section of the Earthna website and engagement with designers, website developer etc. On-going maintenance would be around £1,000 a year.
ENVIRONMENTAL DEVELOPMENT			
REDUCED GHG EMISSIONS AND INCREASE BIODIVERSITY FROM SHIFTS IN BEHAVIOUR		Not quantified	Although this is hard to quantify, various studies have found that enhanced understanding of environmental impacts and knowledge sharing around solutions and innovation can support businesses and individuals to decarbonise and reduce their impact on the environment.
HUMAN DEVELOPMENT			
COMMUNITY AWARENESS OF ENVIRONMENTAL IMPACTS		Around 90,000-160,000 site visits per year	The population of the MENA region and Europe are roughly comparable. The European platform has steadily grown since it was launched in 2017 and now has around 91,000 visits in 2021. This is a low number of visits compared to comparable websites and we can assume that site traffic would be higher with sufficient promotion over social media channels. ^[62]
SOCIAL DEVELOPMENT			
JOB CREATION		5 people	This intervention assumes that a significant proportion of the content generation would be done through the Contact Group volunteers and that this work would be overseen by a secretariat of 5.

HOSPITALITY

Certification schemes

POLICY DESCRIPTION

The impact assessment focuses on the mandatory adoption across the Qatari hospitality industry of sustainability certification schemes including Green Key.^[53] Ahead of the 2022 FIFA World Cup, 8 Qatari hotels introduced the Green Key award scheme.^{[53], [54]} This is a voluntary international eco-labelling scheme for the hospitality industry which requires hotels to incrementally increase the percentage of non-mandatory criteria met each year. These include criteria around energy efficient lighting, water, washing and cleaning, sustainable procurement, staff training and recycling, among others.^{[53] [55]} More than 3,700 hotels and other establishments in 60 different countries are already participating in the scheme.^[53]

POLICY OBJECTIVES AND INTENDED EFFECTS

The initiative would mandate the adoption of the Green Key ecolabel. This would improve the environmental performance of individual establishments, raise awareness and create behavioural change amongst staff, guests and suppliers of establishments. This is with the aim of reducing the environmental impacts of the hospitality industry by supplementing the impacts of other more general environmental certifications already used by Qatar Tourism such as ISO 20121:2012 Event Sustainability Management System and ISO 14001:2015 Environmental Management System

POLICY ANALYSIS

It is estimated that the implementation of this policy could have a net economic benefit for Qatar over 10 years of QAR 825m (QAR 83m per year). The costs include all membership fees, and the recurring third-party audit are QAR 0.6m. The economic benefits including the QAR 75m per year from the social cost of carbon and the QAR 9.0m per year from the cost of water saved and (1.5 million m3 per year). In addition to significant energy, water and carbon emissions savings, estimated to be circa 0.07MtCO2e per year. These represent significant potential

economic benefits of expanding the scheme from 8 to all 109 hotels in Qatar.^[54]

Additional costs could stem from the necessary infrastructural changes, such as more energy efficient conditioners. Further benefits could arise from electricity savings (not calculated due to insufficient data) which could reduce operational costs, and from waste production (1.8kt of waste reduction).

The true impact of these measures would depend on the ability of each hotel to comply with the criteria under the Green Key Award scheme.^[55] The potentially different implementation timelines for different hotels would also likely impact the extent of the emissions reductions and of the other benefits. The expansion to the scheme to all Qatari hotels will likely also have little effect on the hotels already participating in the scheme. It would also require a legislative intervention from the Qatari government and auditing would be needed to ensure compliance which would add to the cost of delivery for the scheme. The impact of the adoption of the Green Key Award, however, would be greatly supported by the complementary adoption of the PLEDGE on Food Waste.^[30] The PLEDGE certification scheme would provide excellent support to the recommendations made for the reduction of food waste under the Green Key Awards.^[56]

A number of certification schemes have been introduced to improve the sustainability of the hospitality and tourism industry. Most of these are voluntary schemes run by third parties, such as the Green Key Awards. Another such example is the introduction of a sustainability standard for tourism (ISO: 21401:2018), in 2018, by the International Organization for Standardization.^[57] There are limited historic examples where government mandates have been introduced to specifically target the entire hospitality sector. The EU introduced the EU Ecolabel voluntary scheme in 1992.^[58]

Across all certification schemes, including the EU Ecolabel and the ISO standard, there is limited evidence of the environmental and economic effectiveness of the schemes, any unintended consequences, and long-term broader economic and social benefits. Where studies have been done, they are on a limited number of hotels and/or they focus on the environmental impacts rather than the costs of implementation. It is therefore difficult to assess the cost effectiveness of the intervention. Evidence is limited and most analyses on the success of certification schemes are qualitative and focused on the impact they have had on staff awareness or perception of cost savings/ emissions savings rather than metered data. Furthermore, since the effectiveness of certification schemes relies to a large degree on the buy-in of staff, mandating schemes may not always achieve the same impact.

The following impact assessment calculations are based on a 2021 study conducted by the TUI Group.^[59] As part of their research, TUI examined their more than 300 hotels worldwide and compared those that had received Global Sustainable Tourism Council (GSTC) accredited sustainability certifications with those that had not. GSTC certified hotels include those who have achieved the Green Key award.^[60]

The impact has been assessed below for the remaining 101 hotels in Qatar not already Green Key certified adopting Green Key.

IMPACT ASSESSMENT

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
ENVIRONMENTAL DEVELOPMENT			
WATER USAGE SAVINGS		Average water savings of 1.5 million m3 per year	TUI study found 19% less water used per guest night for hotels with certification. ^[60] As 8 hotels in Qatar already have Green Key awards this calculation shows the water savings should the remaining 101 adopt the award. ^{[53] [25]} Hotel water usage divided by per occupied room per night: 1631.7 litres. ^[25] Number of occupied room nights in 2019: 5,392,971. ^[51] Total hotel water usage in Qatar: = 8,799,710m3. Minus 8 hotels, 19% = 1,549,000 m3.
			Methods to reduce water consumption include aerating the water, reducing the pressure, and introducing in-building recycling systems. ^[61] One US study showed that installing low-flow showerheads and aerated faucets saved \$1.50 per room per month for one hotel, and using water-efficient toilets saved the same hotel 800m3 of water per year. ^[62]

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
ENVIRONMENTAL DEVELOPMENT			
CARBON EMISSIONS SAVINGS		0.07MtCO2e per year	TUI study found a 10% reduction in emissions per guest night in hotels that were certified. ^[60] As 8 hotels in Qatar already have Green Key awards this is the emissions savings should the remaining 101 adopt the award. ^[53] ^[25] Emissions per room: 28,854kgCO2e per year. ^[25] Number of hotel rooms in Qatar, 2019: 24,562. ^[51] Emissions per year from hotels: 709 ktCO2e per year. 10% reduction would save 70.9ktCO2e per year. Minus the 8 hotels already certified = 65.7ktCO2e.
REDUCTION IN WASTE		1.8kt of waste reduction per year	<p>No data is available on the waste produced by hotels. Assuming that waste per guest is the same as in the domestic sector (1.5kg per person per day. ^[34]) Waste from the hospitality sector per person would be 1.5kg x 5,392,971 touristic nights = 8,089 tonnes. ^[51]</p> <p>Expected waste from hotels would be 8kt waste per year. 2019 statistics are used to be representative of guest numbers in an average year (and not impacted by COVID or the World Cup). The TUI study found that hotels with certification schemes produce 24% lower waste per guest night. ^[60] 24% waste reduction across 101 hotels would save 1.798kt of waste per year.</p>
ECONOMIC DEVELOPMENT			
COMPETITIVENESS		Improved competitiveness	Studies on Spanish hotels have found that those hotels which are certified under ISO standards recorded stronger sales and earnings before taxes compared to those that were not certified. ^[25]

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
ECONOMIC DEVELOPMENT			
UPGRADING OF INFRASTRUCTURE	Not quantified		Costs vary significantly depending on hotel. Depends on the modernness of the hotel. More recent hotels will have to invest less in energy saving technologies and infrastructure e.g., water saving equipment on taps, replacing air conditioning units with more efficient models etc. Based on CDP reports, retrofits to improve energy efficiency in building services, HVAC systems, lighting, refrigeration and building controls have returns of investment of 1 to 10 years. New efficient lighting systems had a payback period of only 2 years. ^[63] However, the paybacks in Qatar are likely to be lower due to low electricity prices.
GREEN KEY AWARD MEMBERSHIP	<p>QAR 901,500 for all the remaining hotels to get certified</p> <p>QAR 606,000 per year additional cost for annual renewals</p>		<p>Membership costs depend on the size of the hotel and whether it is 1-3 star (QAR7,500 per hotel in the first year) or 4-5 star (QAR 9,500 per hotel in the first year). In 2019 there were 109 hotels in Qatar, of which 80 were four- and five-star and the remainder one-, two- and three-star hotels. ^[51]</p> <p>According to the Green Key Award website, 8 Qatar hotels are currently Green Key Award certified (all of which are 4 and 5-star hotels). ^[53] In order to certify all its hotels, the government would need to certify 72 4 and 5-star hotels and 29 1 to 3-star hotels.</p> <p>= QAR901,500 for all the remaining hotels to get certified.</p> <p>Renewal is around QAR6,000 each year ^[54] so the total renewal cost for the additional 101 hotels would be QAR 606,000 per year.</p> <p>All of the above costs include the full cost of the levy and the audits required for the Green Key Award certification.</p>

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
ECONOMIC DEVELOPMENT			
WATER UTILITY COSTS		QAR 9.0 million per year	Kahramaa's commercial utility costs is QAR5.8/m3 Volume of water saved (from below) is 1.549 million m3/yr
SOCIAL COST OF CARBON		QAR 75 million saved per year	Based on the UK's Green Book 2022, the social cost of carbon from its contribution to climate change is QAR 1,065 per tonne. ^[12]
HUMAN DEVELOPMENT			
STAFF	4 additional Qatari employees		TUI study found local employment increased by 9% across hotels with certification. ^[60] According to the PSA 2019 data there are 50 Qatari employees in the short-term accommodation sector. ^[51] Increases in non-Qatari employment not included.
TRAINING	Not Quantified		By participating in the certification scheme, hospitality staff would receive extensive training on numerous issues relating to the sustainability of their sector, ranging from energy and water saving, to sustainable procurement etc.
SOCIAL DEVELOPMENT			
STAFF AWARENESS OF ENVIRONMENTAL IMPACTS		Not Quantified	Increased awareness of environmental impact and improvement in environmental performance through behaviour change.
GUEST AWARENESS		Not Quantified	No improvement in guest awareness of environmental impacts unless communication strategy is considered alongside it

NATIONAL DATA COLLECTION FOR WATER AND ELECTRICITY

POLICY DESCRIPTION

Hotels in Qatar have been identified by the Cornell Hotel Sustainability Benchmarking (CHSB) as some of the most carbon intensive in the world, with average emissions measuring 90kg CO2 per occupied room per night, and energy use an average of 250.4kWh and water consumption 1631.7 litres per occupied room per night. ^[25] This policy aims to reduce the energy demand in hotels by enabling hoteliers to quantify and reduce their energy consumption whilst simultaneously saving on operational costs. Such a policy is already being undertaken by Qatar's water and electricity company, Kahramaa, that aims to install 600,000 meters in Qatar by the end of 2023. ^[64]

POLICY OBJECTIVES AND INTENDED EFFECTS

This policy would allow hotels to account for their carbon emissions and allow them to identify the areas that can accrue the most cost-savings and carbon emission reductions. It would also help the government develop more targeted policy interventions driven by data. However, in order to be effective at driving change directly, it would need to be run alongside an awareness campaign that would allow guests to become more aware of their consumption and encourage information-based behaviour change. It would also need to be paired with efforts from the staff itself to reduce energy and water consumption in hotels.

POLICY ANALYSIS

It is estimated that the implementation of this policy could provide Qatar a net economic benefit of over QAR 31m per year, with almost half of the necessary expenditure (QAR 65,400) being a one-time infrastructure development and installation cost, with the only estimated other costs representing annual costs for maintenance and disposal etc. The benefits could include significant, energy (38GWh per year), water (1.5 million m3 per year) and carbon emissions savings, which are estimated to

amount to circa 0.02MtCO2 per year. The carbon emissions savings, however, would depend on both hotel staff and guests making behavioural changes to reduce consumption as a result of the installation of metering systems and the gathering of data.

The estimates are based on the assumption that all hotels would achieve similar results, irrespective of their size or clientele, or of their different ability to adapt. The primary benefit of this policy would be to inform policy making. However, this intervention may not be additional if Kahramaa have already installed smart meters in some or all hotels.

The impact assessment is based on the results of a 2019 cost-benefit analysis study of the 'Smart Meter' rollout programme in the UK. ^[29] The study looks at the costs and benefits associated with implementing smart meters in domestic and non-domestic sectors. The findings of the study have been adapted to the Qatari context to estimate the potential savings of implementing smart metering across all hotels in Qatar.

IMPACT ASSESSMENT

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
ENVIRONMENTAL DEVELOPMENT			
ENERGY SAVING		38GWh per year	In the UK, there was an estimated reduction as a result of smart metering in energy consumption of 2.8% in the non-domestic sector. ^[29] The mean hotel energy usage per occupied room in Qatar is 250.4kWh. ^[25] Total occupied room nights in Qatar in 2019 are 5,392,971. ^[65]
WATER SAVING		1.5 million m ³ per year	According to the 2019 National Infrastructure Commission in the UK, smart meters reduce average water consumption by 17%. ^[66] The mean water usage per Qatari hotel room is 1631.7 litres. ^[25]
REDUCED CARBON EMISSIONS		0.02MtCO ₂ per year	<p>Contrary to the UK, most energy production in Qatar relies on LNG. It is estimated that 1MWh produces 180kg CO₂e of emissions, derived from LNG (on the basis of GHG emissions conversion tables used by the UK government). ^[67]^[60]</p> <p>63% of Kahramaa's water comes from desalination. ^[68] 63% of 1.5 million m³ = 0.9 million m³ saved from desalination. It is estimated that the equivalent consumed electric power per m³ of desalinated water by the MSF desalting system is 20kWh/m³. ^[69]</p>
ECONOMIC DEVELOPMENT			
IMPLEMENTATION COST	QAR 65,400 one off cost		<p>The meter fee is QR 600 (this is the sum of meter installation fee (QR 200) and meter replacement fee (QR 400). The replacement will need to take place circa every 15 years). ^[70] QAR 65,400 for all hotels.</p> <p>In the UK, the annual operations and maintenance cost for smart meters are estimated at 2.5% of the meter purchase cost. ^[29] Assuming this is also true for Qatar, it will cost QAR 818.</p>

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
ECONOMIC DEVELOPMENT			
ANNUAL COSTS	QAR 3,662 per year		This includes the consumer engagement campaign costs, meter disposal costs, legal, contractual, trial costs, and smart metering assets costs. In the UK this is estimated at £1,205m. ^[29] Assuming Qatar will have the same benefits, this is calculated by dividing the total cost by the total number of meters installed (i.e. £1,205 m/16.15 m meters). ^[71]
WATER SAVINGS PER YEAR		QAR 8.7 million per year	Kahramaa's commercial rate for water usage is 5.8 QR/m ³ [70] This is multiplied by the total water savings estimated above (1.5 million m ³ per year).
NETWORK BENEFITS		QAR 11,227 per year	The UK impact assessment assumes implementation of this policy will have network benefits for network operators who can use data to make better informed investment decisions and save from outage detection and management. It is assumed that Qatar will also reap the same benefits. Network benefits are based on UK benefits per meter which is calculated by total benefits/total number of meters installed (£374m/16.15 meters). Estimated at £23 = QR 103. Multiplied by total hotels (109 meters). ^[29]
SOCIAL COST OF CARBON		QAR 22 million saved per year	Based on the UK's Green Book 2022, the social cost of carbon from its contribution to climate change is QAR 1,065 per tonne.
ECONOMIC DEVELOPMENT			
A HEALTHIER POPULATION FROM BETTER AIR QUALITY		Not quantified	The reduction in GHG emissions and water consumption could also have a positive impact on human health, particularly when paired with other policy interventions.
INCREASED SOCIAL AWARENESS OF SUSTAINABILITY ISSUES		Not quantified	The use of metering and data collection for water and electricity consumption could also increase the awareness of the local population of sustainability issues.

TOURISM 'INSIGHTS' DATA COLLECTION PROGRAM

POLICY DESCRIPTION

A data collection programme in the form of a two-part survey. The first part would be in the form of a standardised online survey which would be issued by all hotels in Qatar to all guests to understand attitudes toward sustainability in the hospitality sector. Guests would be offered incentives such as loyalty points in return for completing the survey. The second part of the data collection program would consist in a representative survey of consumers across different markets to assess different perceptions on the environmental impact of tourism and the importance of sustainability when travelling. This would focus on surveying nationals of some of the countries which visit Qatar the most and nationals of other states which Qatar would like to target as potential tourists.[73] This policy intervention seeks to address the challenges presented by the absence of availability of data on tourism trends and desires in Qatar and on consumer perception of sustainability issues within the hospitality industry.

POLICY OBJECTIVES AND INTENDED EFFECTS

Qatar Tourism and the Qatar Planning and Statistics Authority gather data to monitor international arrivals in Qatar and stays in Qatari hotels, as well as on the environmental impact of different economic activities in Qatar. This initiative would complement other sustainability interventions in the hospitality sector and enable targeted interventions. The two surveys would gather data on areas such as: tourist appetite for sustainable accommodation, reasons for travel and interest in sustainable travel, priority features for tourists in hotels (e.g. sustainable food, affordability, impact on the environment), perception of responsibilities with regards to sustainability interventions, and perceptions of availability and affordability of eco-friendly accommodation and activities in Qatar). [73] By gathering this type of data, which would supplement the statistics on hospitality and environmental impacts of economic activities

gathered already by Qatar Tourism and the Planning and Statistics Authority, hotels would be able to understand how they can improve their services and the impact of any sustainability measures on guest satisfaction. At a national level, understanding changing trends and attitudes from visitors to Qatar could help inform national policies and ensure that Qatar's tourism industry stays relevant and attractive to international trends.

POLICY ANALYSIS

As of present there is little data on the priorities and preferences of visitors to Qatar. A similar survey of consumer behaviour by tourists in Europe published by the TUI Group in 2017 found that, across the surveyed countries, 1 in 10 people make the conscious choice to book environmentally friendly holidays.[74] Among those who said they did not, the majority argued that the main reason for not doing so was the lack of availability of sustainable holidays. The majority also said that they would book more sustainable holidays if they were more readily available. The reduction of their carbon footprint and the protection of biodiversity were the main reasons for interest in sustainable travel. The majority of people surveyed also agreed that they have a better perception of holiday companies that actively invest in environmental and social initiatives. Consumers also argued that the best hotel initiatives were food and energy related. The majority of respondents also argued that brands have a larger role in making the hospitality sector more sustainable than consumers do as individuals. However, the responses were not homogenous across all the surveyed countries, demonstrating that the appetite for ecotourism and more sustainable travel is not the same across all geographies.

The costs in the assessment below have been calculated based on how much it could cost in the UK to run A) a representative online survey of consumers within 5 different markets (for a

sample size of 1000 respondents each = 5000 respondents in total); and B) an open survey of hotel guests distributes via hotel partners. One issue which may be incurred when implementing this intervention is the difficulty in getting representative samples in all the countries.

In some, in particular, it may be complex to get a large enough sample of respondents. Not all respondents would likely be active 'holiday goers', so the survey would need to be carefully designed to target people who actively go on holiday.

IMPACT ASSESSMENT

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
ECONOMIC DEVELOPMENT			
TARGETED INTERVENTIONS AIMED AT EMISSIONS AND WASTE REDUCTION AND IMPROVING BIODIVERSITY		Not quantified	Monitoring the impacts of tourism on biodiversity and the natural environment could also enable the adoption of effective and targeted interventions which, in turn, could reduce the environmental impacts of the hospitality sector, ranging from emissions and waste production, to pollution, and biodiversity loss.
COSTS OF RUNNING THE TWO SURVEYS	QAR 350,000		<p>The costs have been calculated by requesting a quote for how much it could cost in the UK to run a two-part survey comprising:</p> <p>a) A representative survey of consumers which would be distributed across 5 different markets through a survey panel provider. In order to gather around 1000 respondents per market (and make it nationally representative) the survey is estimated to need to be open for about a week.</p> <p>b) An open survey of hotel guests distributed via hotel partners. In order to provide a somewhat representative results, such survey would need to remain open for at least 4 weeks.</p> <p>Direct costs (i.e. supplier costs) could be around £40,000, which includes platform, sample, translations, data processing etc. Additional costs (another £40,000) could include the questionnaire, designing the tab spec, analysing the data, preparing the report, project management etc., for an estimated period of around 3 months. Some of these costs may be absorbed by existing data collection budgets for entities such as the Qatari Planning and Statistics Authority or Qatar Tourism. The total cost of running the two surveys over a total period of 3 months and analysing the results would be £80,000. Repeating the surveys 10 years later would lead to a new cost of £80,000.</p>

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
ECONOMIC DEVELOPMENT			
ECONOMIC BENEFITS LINKED TO THE ADOPTION OF MORE TAILORED POLICIES		Not quantified	<p>A similar survey of consumer behaviour by tourists in Europe published by the TUI Group in 2017 found that, across the surveyed countries, 1 in 10 people make the conscious choice to book environmentally friendly holidays. ^[74]</p> <p>Running a tourism 'insights' data collection programme would help to more carefully tailor policies targeted at increasing the overall sustainability of the hospitality industry. By monitoring ecotourism trends in Qatar, for instance, or the perception of tourists and travellers in Qatar about the importance of sustainability in the hospitality sector, Qatar Tourism could identify which categories are the most interested in sustainable tourism, and what elements of the Qatari hospitality industry they find the least sustainable. Such a survey could also provide the government with an indication about what guests consider the easiest sustainable shifts within the sector.</p> <p>Through the use of a survey similar to that carried out by TUI Qatar Tourism could also monitor the success of its certification schemes for the hospitality industry, and observe the potentially assess the impact of financial incentives for guests and staff to adopt more sustainable practices such as recycling.</p> <p>The combination of these efforts may provide Qatar with the means to place itself at the forefront of the global ecotourism market. The results of the survey could also indicate that the consumer appetite for sustainable travel in Qatar is low. If this were the case, the financial and practical burden of adopting more sustainable practices would primarily fall on the industry, rather than on guests.</p>

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
ECONOMIC DEVELOPMENT			
DECREASE IN EXPENSES TO ADDRESS ENVIRONMENTAL HARMS		Not quantified	Monitoring the impacts of tourism on biodiversity and the natural environment could also enable the adoption of effective and targeted interventions which, in turn, could lower Qatar's expenditures to address environmental impacts, pollution, and biodiversity loss.
HUMAN DEVELOPMENT			
INCREASED ENGAGEMENT AMONG BOTH HOSPITALITY STAFF AND THE BROADER POPULATION		Not quantified	By observing trends in consumer behaviour and those within the hospitality sector, Qatar could also monitor the engagement from both staff and guests. By sharing such 'insights' Qatar could increase the engagement from staff, local guests and tourists by showing them the outcomes and the potential benefits for the Qatari economy and environment.
JOB CREATION		Not quantified	By adopting targeted interventions through the use of 'insights' into the tourism industry, Qatar could grow its hospitality sector which, in turn, would lead to job creation.
SOCIAL DEVELOPMENT			
INCREASING QATAR'S GLOBAL VISIBILITY AND REPUTATION		Not quantified	By sharing such 'insights' Qatar could also reiterate its status as a front-runner in global efforts to green the hospitality sector following the success of the 2022 FIFA World Cup and increase Qatar's global visibility.
INCREASE SOCIAL COHESION		Not quantified	By observing trends in consumer behaviour and those within the hospitality sector, Qatar could also adopt policies aimed at strengthening the social cohesion within the country.

FINANCIAL INCENTIVES FOR INDIVIDUALS AND BUSINESSES THAT RECYCLE AND FOR SUSTAINABLE HOSPITALITY DEVELOPMENTS

POLICY DESCRIPTION

Internationally, access to finance can be a significant hurdle for the hospitality sector when it comes to making changes towards a more low-carbon, environmentally friendly approach. This financial support can take many forms including subsidised loans (with reduced interest rates), grants, subsidies for certifications and tax breaks. Tax in Qatar is very low, with Qatari-owned businesses being exempt from business tax and VAT yet to be introduced. Therefore, tax incentives are unlikely to be appropriate in Qatar, as many hotels are Qatari-owned. However, incentives which target guest behaviours could support a transition to circular economy.

POLICY AIMS, OBJECTIVES AND INTENDED EFFECTS

To make changes which impact on guest experience it is important that guests are informed of the environmental benefits and rewarded for making eco-friendly choices. Reward schemes which encourage guests to turn down room cleaning, reduce towel changes and water and plastic consumption have been found to be effective. In many schemes guests

are offered credits for the hotel restaurants or reward points, others make donations to charity or plant trees. Points based schemes tend to rely on on-going loyalty to a particular hotel and can be hard to claim, with case studies having shown that up to 70% of points remain unclaimed.^[75] Tangible benefits such as discounts on food, drink or spa experiences are more popular with guests.^[75]

POLICY ANALYSIS

Although schemes to incentivise guests to forego room cleaning have been running for many years, there have been no comprehensive studies into the effectiveness of these schemes for driving sustainable behaviour in guests. The Marriott discontinued their “make a green choice” programme as “among members the overwhelming majority do not choose the Make a Green Choice option”.^[76] There are risks of unintended consequences from the schemes that need to be assessed and could negate environmental benefits. For example, rooms that are not regularly cleaned may require more time, energy and water to clean at the end of a stay.^[75]

IMPACT ASSESSMENT

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
ENVIRONMENTAL DEVELOPMENT			
REDUCED GHG EMISSIONS		Not quantified	Reduced emissions from cleaning and laundry. However, cleaning at end of stay need to be more thorough and could negate some of these savings.
WATER USE		Not quantified	In a 300-room hotel, towel and linen reuse programmes can reduce water usage by 236m ³ . ^[77]
ECONOMIC DEVELOPMENT			
REDUCED COST OF UTILITIES		Not quantified	Lower energy and water bills due to lower cleaning.
STAFFING COSTS		Not quantified	Fewer staff hours needed to cover cleaning of rooms.
HUMAN DEVELOPMENT			
COMMUNITY AWARENESS OF ENVIRONMENTAL IMPACTS		Not quantified	Increased consumer awareness about which behaviours impact on the environment.
SOCIAL DEVELOPMENT			
CUSTOMER SATISFACTION		Not quantified	Reward scheme could improve the perception of the hotel to visitors.

BENCHMARKING: ENCOURAGE BUSINESSES TO BECOME A SIGNATORY TO THE PLEDGE ON FOOD WASTE

POLICY DESCRIPTION

This policy would mandate four- and five-star hotels to become a signatory of the PLEDGE on food waste. The PLEDGE is a Singapore-based global certification and benchmarking system for the food and restaurant sector. It was launched at COP27 and aims to ensure food operations send zero food waste to landfill while making cost savings. [30] Becoming a signatory to the PLEDGE involves undergoing third party auditing on compliance with 95 criteria split into 7 different pillars spanning across the entire food chain in the restaurant, from the moment it is ordered to post consumer management, with the aim of preventing food waste. Different certifications (All Star, Gold, Silver, Bronze) will be awarded on the basis of compliance with 70% - 100% of the PLEDGE criteria. [30]

POLICY OBJECTIVES AND INTENDED EFFECTS

According to UNEP, in 2021, 72,418 tonnes of food were wasted by all Qatari food services and hotels.[78] This approach aims to ensure that the hospitality sector reduces its food waste, reduces emissions as a result of lower quantities of waste entering landfill. On the basis of successful case studies, the PLEDGE staff posits that by joining the PLEDGE, restaurants and hotels can achieve up to a 40% reduction in food waste, resulting in a significant reduction in each hotel's carbon footprint and adding economic benefits.[30] Across all the different four and five star restaurants and hotels that have taken part in the PLEDGE certification scheme so far, there has been an average of 30% reduction in food waste in addition to a significant reduction in each restaurant's CO2 emissions and a 3%-5% reduction in costs. [39] [79] Additional benefits include increased employee and consumer engagement as well as the efficient mapping of food waste solutions and the use of food waste for the production of compost and energy. [30]

POLICY ANALYSIS

Overall, it is estimated that the net economic benefit each year from implementing this policy would be QAR 12m over a 10-year period. Since it would cost QAR487,386 to certify all 80 four- and five-star hotels in Qatar. Key costs include costs for companies participating in the PLEDGE scheme and certification process. Key benefits could come from reduced costs as a result of cutting down on unnecessary purchasing of food. If all 80 four- and five-star hotels and their restaurants in Qatar were to participate in the scheme, Qatar could save circa 1.8kt of food in the first year. Assuming most of this food waste would be landfilled, Qatar could also reduce its emissions by 0.001MtCO2e. Socially, this policy may bring about enhanced awareness about food waste in the hospitality sector in addition to opening up opportunities for the donation of surplus food

Qatar would be the first country in the MENA region to participate in the PLEDGE scheme, and so it could showcase its sustainability efforts. Participation in the PLEDGE on Food Waste would be complementary to, and enhance the beneficial impacts of, adopting the Green Key Awards. However, contrary to the Green Key Scheme, due to the nature of the certification scheme which is designed to be more easily adopted by luxury establishments rather than by all hotels and restaurants, it could only be mandated for four- and five-star hotels who have the necessary structure to implement changes to their food supply chains on a large scale. Furthermore, the scheme relies on donating some food surplus through either government or charity-run schemes in order to achieve such a high level of food waste reduction. In order to achieve similar levels in Qatar, food surplus donation schemes which respect the Qatari rules on food safety must also be put in place for the hospitality sector.

The assessment below is based on the results of four case studies conducted by the PLEDGE staff and their partner LightBlue Consulting on the success of the PLEDGE on Food Waste certification scheme.[80] The case studies look at the roll-out of the scheme in: the JW Marriott Hotel Bangkok (Thailand); the Grand Hyatt Singapore (Singapore); the Sampran Riverside (Thailand); and the Høst Restaurant (Denmark). [80] The size of these hotels/ restaurants and

their gastronomic quality make them comparable to those in Qatar. The experience of these hotels and restaurants is especially relevant since, similarly to Qatar, they all import the vast majority of the ingredients they use. The findings of the case studies have been adapted to the Qatari context in order to estimate the potential savings resulting from participating in the PLEDGE certification scheme for hotels and restaurant in Qatar.

IMPACT ASSESSMENT

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
ENVIRONMENTAL DEVELOPMENT			
LESS FOOD WASTE BEING LANDFILLED		Up to 1.9kt food saved	There is no data available on food waste from hotels but, according to UNEP, in 2021 72,418 tonnes of food were wasted by Qatari food services and hotels. [78] However, the UNEP data combines food waste produced by Qatari hotels and restaurants so we can only make an approximation of the food waste produced by Qatar's four- and five-star hotels. The actual figure is likely to be lower.
			Of a total of 109 hotels in 2019, 31 were four-star hotels and 49 were five-star. [51]. Combined, these represent circa 73% of all the hotels in Qatar, but also 88% of Qatar's pre-FIFA World Cup guest capacity (with 30,157 rooms out of a total of 34,418 in 2019). In 2019 four- and five-star hotels also represented 86% of the nightly stays in Qatar. There were 1,976 restaurants and mobile food services in Qatar in 2020. [81] Based on this, it has been presumed that 90% of the food waste is from restaurants rather than hotels. 7,241 tonnes of food waste would be produced annually in Qatar by hotels. On the basis of the estimates made above, it is presumed that 86% of that food waste would be produced by four- and five-star hotels (assuming that all overnight guests produce the same amount of food waste). For the purposes of this analysis, it is therefore presumed that four- and five-star hotels combined would produce circa 6,227 tonnes of food waste per year.

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
			<p>The restaurants and hotels which participated in the PLEDGE on Food Waste scheme achieved an average 32% reduction in food waste within the first 12 months of joining the scheme ^[80]. Taking into account Qatar's different climactic conditions to the those in the PLEDGE case studies, namely, the greater heat and higher food spoil rate, it is likely that the average success rate would be slightly lower. Many of the hotels and restaurants participating in the PLEDGE also reduce some of their food waste by donating surplus through government-led or privately run food collection programmes. In Qatar, however, there are strict rules on the donation of food waste, which include the prohibition to donate cooked food and to sell of donate food that is within 12 days of its sell-by date. ^[32] For the purposes of this assessment it was assumed that circa 30% of food waste could be reduced but the figure could be lower.</p> <p>On the basis of the calculations made above, it is estimated that if 100% of Qatari four- and five-star hotels were to take the PLEDGE, and achieve an average reduction of 30% of food waste each, they could achieve a reduction of circa 1,868 tonnes of food waste within the first year. ^[69]</p>
EMISSIONS SAVINGS		0.001MtCO2e	The majority of domestic waste in Qatar goes to landfill. ^[34] If all of this food waste were landfilled (precise data on this missing), it would produce 1,170 tCO2e each year (626.856 kgCO2e per tonne). ^[82]
LESS LAND BEING UNNECESSARILY USED FOR LANDFILLS		Not Quantified	By reducing food waste in the hospitality sector, Qatar would also reduce the among of space required for landfills.

IMPACT ASSESSMENT

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
ECONOMIC DEVELOPMENT			
COST OF PARTICIPATING IN THE PLEDGE SCHEME FOR ALL FOUR- AND FIVE-STAR HOTELS	QAR487,386 one off cost		<p>PLEDGE certification is only applicable for four- and five-star hotels due to the different use of ingredients and staff specialisation in kitchens of higher-end restaurants. According to information shared by the PLEDGE, it costs each hotel USD 1,020 to join the PLEDGE scheme and USD 650 to undergo the third-party auditing process to receive the formal certification. Prior to the FIFA World Cup in 2022, there were 31 four-star hotels in Qatar in 2019 and 49 five-star hotels. ^[51] Becoming PLEDGE certified would cost each of them a total of USD1,670. Overall, it would therefore cost USD 133,600 to certify all 80 of Qatar's four- and five-star hotels and their restaurants. If this scheme was mandatory, this cost could be covered by the government.</p>
COST OF FOOD		Not quantified (up to 3% - 5% of each hotel's overall expenditure)	<p>By participating in the PLEDGE scheme and collaborating with LightBlue on the use of digital tracking of food being purchased and wasted in their Mezza9 Restaurant, the Grand Hyatt Hotel Singapore reduced its food waste by 22% in 10 months, saving USD100,000. In the case of the Høst Restaurant in Denmark, by reducing their food waste by 45% in 12 months the restaurant saved USD35,000.</p> <p>Such reductions in food waste were achieved through efforts to buy less and use-up all leftover ingredients from one dish for another, as well as a result of training on sustainable procurement and more efficient food conservation and consumption. Food tracking played a crucial role in the reduction by identifying at which stages of food production the waste is produced and why. The PLEDGE Staff estimated that, overall, the average cost saving for all the hotels and restaurants participating in the scheme was between 3% and 5% of their overall costs. Since the cost of food in Qatar is likely to be different from that in Singapore and Denmark, it is impossible to make a precise estimate with regards to the economic benefits resulting from the decrease in food waste.</p>

IMPACT ASSESSMENT

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
ECONOMIC DEVELOPMENT			
LESS MONEY SPENT ON LANDFILLING		Not Quantified	Since most food waste in Qatar is landfilled, savings will also be made as a result of lower quantities of food waste requiring transportation to the Qatari landfills.
SOCIAL COST OF CARBON		QAR 1.2 m	Based on the UK's Green Book 2022, the social cost of carbon from its contribution to climate change is QAR 1,065 per tonne CO ₂ e. ^[11]
HUMAN DEVELOPMENT			
DONATION OF SURPLUS FOOD		Not Quantified	Since starting its journey in 2018, the JW Marriott Hotel in Bangkok has donated nearly 1.5 tonnes of food. The hotel started with a 30.4% reduction in food waste over the course of the first year of the scheme and is working towards a 50% reduction by 2025. ^[80] In Qatar, however, there are strict rules on the donation of food waste, which include the prohibition to donate cooked food and to sell of donate food that is within 12 days of its sell-by date. ^[32] On this basis, we can recommend that Qatari hotels participating in the scheme would also donate some of their potential food waste.
UPSKILLED STAFF AS A RESULT OF THE PLEDGE TRAINING PROGRAMME		Not Quantified	By participating in the PLEDGE scheme, the hospitality staff in Qatar would also receive training, leading to an upskilling of the workforce.
SOCIAL DEVELOPMENT			
AWARENESS ABOUT FOOD WASTE WITHIN THE HOSPITALITY SECTOR		Not Quantified	As was the case for the hotels used as case studies by the team of the PLEDGE on Food Waste. ^[80]

OTHER POLICIES

Additional policies were identified which overlap with interventions set out above, but could be stand-alone interventions:

a) Increase awareness of guests and staff of sustainable approaches

An issue highlighted during consultations was the general lack of awareness on sustainability in the Qatari hospitality sector. The initial consultations highlighted that, among other things, some guests deliberately use single-use plastics under the assumption that single-use plastic products are more hygienic. However, single-use plastics can expose people to numerous harmful chemicals. ^[83] Increasing awareness on sustainability issues through knowledge sharing was initially suggested as a means of improving the sustainability and circularity of the hospitality industry. A policy that was initially proposed which involved the organizing of internal training for staff and the use of visual aids to encourage gets to adopt more sustainable practices, such as choosing not to have their towels washed every day, switching off lights and not using single-use plastics. An initial assessment determined that training and awareness raising efforts must be taken into account in order to award ISO hospitality certifications and Green Key Awards, which has been proposed in this report as another policy through which to foster sustainability across the hospitality sector. Furthermore, training of staff in hotels would also be provided in the case of participation in the PLEDGE on Food Waste certification scheme. The policy proposing to separately increase the awareness of both guests and staff of sustainable approaches within the hospitality industry was found to be superfluous.

b) A holistic sustainable procurement policy for the tourism sector

A holistic sustainable procurement policy for the tourism sector could include sustainable procurement policies for food and beverage/ housekeeping, eco-labelling, supply chain transparency, data collection and availability, and reward schemes for guests who adopted more sustainable practices. It was determined that this policy would also be encompassed in the adoption of ISO certification standards or Green Key Awards across the Qatari hospitality industry, as well as by participation in the PLEDGE on Food Waste certification scheme.

FOOD AND DOMESTIC WASTE

Extended Producer Responsibility Regulation

POLICY DESCRIPTION

In the UK and Europe extended producer responsibility schemes have been introduced to ensure that the producers of plastic and other waste packaging are responsible for the cost of the whole lifecycle of the packaging. [84] This includes sorting and recycling. This scheme would apply to all packaging producers, manufacturers and importers who would need to report how much packaging, and of what type, had been placed on the market.

POLICY AIMS, INTENDED EFFECTS, OBJECTIVES

The scheme aims to put the full net financial cost of managing household packaging waste across its whole life cycle onto producers who are best placed to influence packaging design. This means that the cost of recycling is not borne by the government or general public. The intention is to encourage packaging producers to create packaging that is more easily recyclable, and where it is not, pay for the cost of disposal.

Packaging producers are obliged to pay modulated fees on packaging (the fees vary depending on the type of packaging and how easy it is to recycle) and mandatory recycling labelling on the packaging to indicate whether the packaging is recyclable or not. [84] Exporters of packaging for recycling will need to provide detailed evidence on the packaging exported as well as proof it has reached its final destination. The main producer categories obligated in the UK scheme are raw material manufacturers, packaging conversion, packers/fillers and sellers. Importers of packaging and service providers are also obligated. [84]

POLICY ANALYSIS

There is no data on packaging businesses within Qatar so it is not possible to determine how many businesses in Qatar would be subject to the scheme. In the UK the scheme applies differently depending on the size of the business with SMEs only having to report on their packaging and not

pay for full net cost of managing the disposal and recycling of the packaging. [84] It is likely that the majority of the costs of the scheme in Qatar would fall on importers as there is little manufacturing within Qatar.

The annual cost to businesses is assumed to be around QAR 518m, however this will reduce the burden on government by QAR 510m per year as the collection and processing of recycling costs will be borne by businesses. The scheme would save around 290kt of packaging waste from landfill each year with emissions savings of 0.14MtCO₂e if the packaging was recycled. Additionally, the scheme would create new manufacturing industry within Qatar, create jobs and enhance resource security.

An assumption has been made that 30% of domestic waste in Qatar is composed of packaging materials. This is based on 60% of domestic waste assumed to be organic and another 10% miscellaneous. Packaging materials covered by the EPR include plastic, wood, aluminium, steel, paper/card, and glass. There is no data in Qatar on the volumes of the waste produced from these materials and so the UK's ratios have been used.

IMPACT ASSESSMENT

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
ECONOMIC DEVELOPMENT			
ADMINISTRATIVE COSTS TO BUSINESSES	QAR 3.8m per year		The UK assumes that the transition costs for producers are 77.9m for labelling, 2.2 million for familiarisation. [84] For the material facility there would be costs of 6.5m for capital and familiarisation. UK costs estimated to be: 135m for administration, 106.2m for compliance, 67.1m for regulator. [84] UK scheme covers 10,406 producers. Average cost of administration for producers including data reporting £3,000 (range 1,000-4,000 depending on size of business). [84]
FULL NET COST OF RECYCLING INCLUDING WASTE COLLECTION AND PROCESSING		QAR 510m per year	Average full net cost payments £256 (QAR 1,123) per tonne according to the UK EPR impact assessment. [84] The full net cost payments would cover the collection of waste, waste infrastructure for households, recycling the waste at recycling centres. This would be charged to producers of packaging waste. The amount charged would vary depending on the type of packaging used.
LABELLING COSTS	QAR 0.8 per year		Assuming waste packaging of 454,460 tonnes each year (QAR 510,358,580). It is assumed that much of this cost would be borne by international importers rather than Qatari companies as there are very few packaging companies in Qatar and the scheme would exclude SMEs. This cost is a transfer of costs from the government to producers of waste rather than a new additional cost. It is likely that the cost of collecting and processing waste would be lower per tonne in Qatar as there are fewer households. Costs will also depend on the mix of materials in Qatar.
			Cost to producers of adding labelling to their product to indicate whether it is recyclable or not. Cost based on UK value per tonne of packaging waste. [84]

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
ECONOMIC DEVELOPMENT			
ENFORCEMENT COSTS		QAR 1m per year	Regulatory costs per year to enforce the scheme. Based on UK value per tonne of packaging waste.
COMMUNICATIONS CAMPAIGN		QAR 2m per year	EPR scheme would need to be accompanied by national campaign to raise awareness of the scheme and build support both with businesses and general public. Cost of comms campaign calculated based on scaling UK cost down as a proportion of UK waste.
SOCIAL COST OF CARBON		QAR 1447.4m per year	Based on the UK's Green Book 2022, the social cost of carbon from its contribution to climate change is QAR 1,065 per tonne CO ₂ e. ^[12]
ENVIRONMENTAL DEVELOPMENT			
EMISSIONS SAVINGS FROM DIVERTING WASTE FROM LANDFILL		0.13MtCO ₂ e	Assuming 286,310 tonnes of packaging is diverted from landfill and recycled each year, based on the emissions calculations in the UK impact assessment. This factors in emissions savings from producing new products without virgin materials. These emissions savings will vary depending on the composition of the waste in Qatar.
BIODIVERSITY			Reduced reliance on virgin materials and reduction of waste in landfills which can cause leaching etc.
WASTE REDUCTION		290kt per year of packaging recycled	<p>UK assumes that EPR will lead to 63% of plastic packaging being recycled by 2033 (across 10-year period).^[84] Adding a sticker about whether product can be recycled was found on shampoo bottles to increase recycling from 87% to 90%.</p> <p>There is no data available on the amount of packaging that is sent to landfill. However, we know that 60% of domestic waste is organic, based on UK data it is likely that 10% of waste is non-organic and non-packaging.^[84]</p> <p>Therefore, we assume that 30% of Qatar's domestic waste is packaging. This is lower than in the UK where the figure is 53%.^[85]</p> <p>This means that each year there is likely to be 454,460 tonnes of packaging disposed of (based on 2021 waste data).^[34]</p>

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
			If 63% of this was recycled over a 10-year period that would lead to a reduction in packaging waste of 2,863,100 tonnes over 10 years (286,310 tonnes a year).
HUMAN DEVELOPMENT			
STAFF	QAR 2.1m per year	7 central government staff to oversee scheme	UK central admin body employ 201 FTEs. [84] Number of staff based on UK staff per tonne of waste. More staff may be needed in Qatar, as UK scheme will be more efficient due to larger scale.
SOCIAL DEVELOPMENT			
AIR POLLUTION			Lower air pollution from reduction in incineration of household waste
INCREASE THE RECYCLABILITY OF PACKAGING			The introduction of modulated fees will encourage producers to make changes to their design and use of packaging to make and use more recyclable packaging. For example, fee rates will be lower for materials which are easily recyclable and higher for materials which cannot be recycled

CAPTURE METHANE FROM LANDFILL

POLICY DESCRIPTION

Rapidly reducing methane emissions this decade from energy, agriculture and waste is regarded as the single most effective strategy to keep the goal of limiting warming to 1.5°C within reach and in line with the Paris Agreement.^[39] Waste is the third largest source of man-made methane emissions. If captured, this methane can be used as a valuable economic and clean energy resource and reduce the sector's significant impact on climate change.^[40]

This policy intervention focuses on the capture of methane gas from the existing DSW landfill site at Mesaieed and, if implemented, could highlight the importance of installing methane capture technology to any future DSW landfill site that might be constructed in Qatar in the future. This policy intervention also addresses the potential for methane capture to be sold as carbon offsets.

THE POLICY AIMS, OBJECTIVES AND INTENDED EFFECTS.

This policy intervention aims to address the environmental and human health benefits of capturing methane from organic landfilled waste and preventing large quantities of greenhouse gases from entering the atmosphere. It aims to explore how captured methane can be used instead as a resource and potentially, sold as carbon offsets. The intended effects will benefit the environment, society, and enable Qatar to succeed in its commitments to reduce its methane emissions. Qatar is a signatory to the Global Methane Pledge, a voluntary effort to reduce emissions.^[39]

POLICY ANALYSIS

The following impact assessment is based on researched data from the Qatar Planning and Statistic Authority, and data published in 2022 from the UK Approved Food Waste reporting.^[86] Information on technology costs have been sourced from industry. When converted to the Qatar context, the net economic benefit of the scheme is estimated to be QAR 251m over its

lifetime (20 years) and a net annual benefit of QAR 12.6m each year. This includes a feasibility study, research and gas capture technology but does not include the cost of processing the landfill gas. It is estimated to prevent 0.01MtCO₂e of emissions each year. The landfill site has the potential to produce 36 million m³ per year of landfill gas. There could also be an opportunity to register this methane capture as a greenhouse emission reduction project with the Global Carbon Council (based in Qatar) to sell emissions savings as offsets. For the landfill gas to be utilised additional infrastructure may be needed to transport and process the gas as well as generate electricity.

Methane Capture will reduce emissions to the air which can help reduce poor air quality.^[87] The Global Methane Assessment from the Climate and Clean Air Coalition and UNEP state that achieving the 2030 goal of collectively reducing anthropogenic methane emissions by at least 30% below 2020 levels by 2030) could prevent over 200,000 premature deaths and hundreds of thousands of asthma related emergencies globally.^[87]

The Ministry of Municipality have recently announced that the Mesaieed landfill site will be closed, and a new landfill will be built.^[88] Dates for the closure have not been made available however, methane capture could continue for many years after waste has stopped being deposited.

Before this can be implemented it will firstly be necessary to carry out a feasibility study on the existing Mesaieed landfill. This will need to identify whether methane capture could be possible and if so, how it can be implemented and what the captured gas could be used for. Therefore, to move forward with this intervention it will be essential for the Government to agree to this initial feasibility stage. Should it be discovered that methane capture from the landfill is possible the economic, environmental, and human benefits are substantial.

IMPACT ASSESSMENT

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
ECONOMIC DEVELOPMENT			
CARBON OFFSET		QAR 0.38m per year	Estimated cost of offsets at the time of writing this report is between QAR29 and QAR36 per tonne (based on Baladna project).
SITE SURVEY	QAR 30,000 on-off cost		A site survey to understand whether the Mesaieed landfill will be suitable for methane collection and the best way to implement this is suggested: QAR 18,000 – QAR 30,000 is estimated for the feasibility study. Design of any collection system must take into account landfill size, location, climate and access to infrastructure. ^[89]
METHANE CAPTURE TECHNOLOGY -FROM EXISTING LANDFILL	QAR 25m upfront costs		The exact size of the Mesaieed landfill is unknown. According to the New Mesaieed landfill document, construction was due to start in 2005 and it was planned to be used for 16 months. It can, therefore, be assumed that the landfill has probably increased in size and is larger than 0.8km ² . ^[90] Costs for methane capture technology can only be estimated as it is not known what technology already exists at the DSWMC or the status of the landfill cover. However, estimates to add a gas management system are said to be between USD29,000 and USD35,000 per acre or per 0.00406km ² for installation capital costs. ^[91]
O&M COSTS PER YEAR	QAR409,000 per year		Estimated costs for annual gas system maintenance are calculated at USD450 to USD570 per 0.00406km ² . Annual O&M costs for 0.8km ² are estimated to be QAR408,578 per year as the site has likely grown since it opened. The costs for O&M would also depend on the use of the captured methane.

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
LANDFILL GAS		Estimate an average of 36 million m ³ of landfill gas could be captured from organic waste per year	<p>PSA stats show that since Mesaieed landfill opened in 2012, 39 Mt tonnes of waste have been sent there.[34] Of this, it is likely that around 4.6Mt is organic waste (based on 60% of this solid waste being organic, and all the "other items" category which is described as coming from "damaged food and slaughtered").</p> <p>A feasibility study is needed to comprehensively determine whether the Mesaieed landfill will be suitable for methane capture or not, and if suitable how much methane could be collected. However, due to Qatar's warm climate and the high percentage of organic waste in the landfill, it is likely that landfill will be viable for methane capture.</p> <p>Methane capture efficiency can be as low as 10% for open landfills with a purpose-built methane capture landfill achieving efficiencies of up to 85%.^[92] As Mesaieed is lined and can be capped when closed, efficiencies from capturing landfill gas are assumed to be high (70%).^[93]</p> <p>Landfills usually produce appreciable amounts of landfill gas within 1 to 3 years. Peak gas production usually occurs 5 to 7 years after wastes are dumped. Almost all gas is produced within 20 years after waste is dumped; however, small quantities of gas may continue to be emitted from a landfill for 50 or more years.^[94] Mesaieed landfill is now over 10 years old so some of the landfill gas will have already been lost to the atmosphere. However, methane production normally takes longer to peak and reaches maximum production after 5-7 years and remains level for the next 20 years. For the purposes of this study, methane emissions have been averaged across 30 years.</p> <p>1 tonne of biodegradable waste is said to produce between 200 and 500m³ of landfill gas total.^[95] Assuming each tonne of organic waste produces 350 m³ of landfill gas.</p> <p>Assuming that (conservatively) about 70% of this would be recoverable over the lifetime of the project (assumed to be until 2043) = 36 million m³ per year.^[96]</p>

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
			There are three main methods of utilising landfill gas: electricity generation, direct use and upgraded renewable natural gas. It could be piped to the DSWMC and used directly, it can be combusted to drive engines or turbines for electricity generation (the electricity generated can then either be used directly or sold to the grid) or purification to natural gas quality where it is cleaned to 100% methane and fed into the natural gas distribution network. ^[97]
SOCIAL COST OF CARBON		QAR 14m per year	Based on the UK's Green Book 2022, the social cost of carbon from its contribution to climate change is QAR 1,065 per tonne CO ₂ e. ^[12]
ENVIRONMENTAL DEVELOPMENT			
EMISSIONS		Average 0.01MtCO ₂ e savings per year	<p>65% of landfill gas (by volume) from organic waste is assumed to be methane with the rest CO₂ (see above).^[97]</p> <p>Landfill emissions from construction and industrial waste (467kgCO₂e per tonne).^[98]</p> <p>Total emissions from the landfill estimated to be: 36,428 MtCO₂e (1,215 MtCO₂e per year).</p> <p>It is assumed that 36 million m³ per year of landfill gas from organic waste is released in total over the lifetime of the landfill (30 years).</p> <p>This methane could be captured for use in residential/business properties. 1 tonne of methane produces 2.75t CO₂ as a by-product of combustion (CH₄ + 2O₂ = CO₂ + 2H₂O, molar mass of CH₄ 16g/mol, molar mass of CO₂ 44g/mol).</p> <p>Each year (over 30 years) = 13kt per year</p> <p>This is an approximation; a full life cycle analysis would be needed to understand the emissions savings.</p>

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
HUMAN DEVELOPMENT			
LEADERS IN INNOVATION	QAR 50,000 total across 2 months		As a new landfill site is planned to be built in Qatar carrying out further research on the use of landfill gas could be beneficial. There are a number of research projects that have already been undertaken in Qatar. The Ministry of Municipality in collaboration with Qatar University have already looked at a project to study techniques for producing biogas from waste to power vehicles by biofuel. ^[99] Research into all University Projects to assess what is taking place now, what research has been done in the past and any gaps is recommended. Estimated cost: QAR 50,000 to cover researcher salary. ^[100] Estimated time 2 months to complete.
AIR QUALITY		Not Quantified	Reduction in respiratory illnesses. The Global Methane Assessment from the Climate and Clean Air Coalition and UNEP state that because methane is a key ingredient in the formation of ground-level ozone (smog), a powerful climate forcer and dangerous air pollutant, a 45 per cent reduction would prevent 260 000 premature deaths, 775 000 asthma-related hospital visits, 73 billion hours of lost labour from extreme heat, and 25 million tonnes of crop losses annually. ^[87]
SOCIAL DEVELOPMENT			
GOALS, TARGETS, AGREEMENTS			The policy is in line with the Qatar National Vision 2030. ^[6] It covers impacts to the environment and human health from greenhouse gas emissions. It encourages education and knowledge on emissions capture technology. Shows commitment to the Global Methane Pledge.

ORGANIC WASTE BIO DIGESTING FACILITIES

POLICY DESCRIPTION

This scheme aims to improve waste collection practices in Qatar and increase the percentage of utilisation of Qatar’s food waste for anaerobic digestion. It includes infrastructure for the segregation of waste organic materials through the implementation of a consistent (separate) collection of domestic organic waste.

There are plans to expand the Domestic Solid Waste Management Centre in Mesaieed (DSWMC) from 2,300 to 5,300 tonnes per day. These include storage facilities, waste sorting and recycling facilities, an anaerobic digestion, composting plant, an incineration plant, a cooling tower and substation. [101] Therefore efficient organic waste segregation and collection will be key to ensuring the most sustainable waste management practices can be put in place in the newly expanded DSWMC.

It Is now a Ministerial decree for corporate and commercial institutions, hospitality, industrial and public stores to segregate their waste, this policy could see this at source organic waste segregation made available for the entire community at their homes.

POLICY OBJECTIVES AND INTENDED EFFECTS.

This policy aims to reduce Qatar’s growing volume of landfilled waste, and also to generate revenue streams from digestate and biogas production through anaerobic digestion of organic waste. The scheme would provide householders with waste bins, collection services, set up waste processing infrastructure, and better utilisation of the collected organic waste which is a valuable resource in this arid climate.

This scheme aims to increase the amount of organic waste available to be processed for anaerobic digestion and biogas generation, reducing the amount of waste going to landfill where it can release harmful greenhouse gases. It will enable individuals to segregate

their organic waste from other wastes at home as opposed to the current situation of placing all DSW in the same bin. It recommends the provision of waste bin infrastructure at all residencies to facilitate this and the upgrading of the DSWMC plant to increase its recycling capacity. The costs of collection could be covered by an Extended Producer Responsibility scheme if paired with that policy.

It should be noted that the other segregated waste (such as plastic, metal and glass) could also be easier to segregate for recycling if the food waste is removed however, dry waste recycling is not in the scope of this waste intervention scheme.

POLICY ANALYSIS

The net economic benefit of the scheme is QAR 1.3bn3bn per year), including the social cost of carbon. Costs for creation of a consistent collection and anaerobic digestion scheme for household food waste could total around QAR 150m in capital expenditure, as well as a cost of QAR 9m per year for operation and maintenance of the waste collection and all processing. The scheme is estimated to generate a revenue of QAR 1.3bn per year (including annual revenues of QAR 34m in carbon offsets, QAR 193m in digestate, and QAR 1,129m saving year from reductions from the social impact of carbon). These revenues are derived assuming the consistent collection of food waste benefitting Qatar by utilising the waste to develop digestate and biogas (estimated to total 0.44Mt of digestate and 99 million m3 per year of biogas). It could also decrease Qatar’s emissions by 1.06MtCO2e per year. The composting of a significant percentage of Qatar’s household food waste could also bring other environmental and social benefits, such as the decrease in land taken up by landfills and a decrease in air pollution.

To implement this policy, waste segregation will need to be mandated by the Government. Consultations with stakeholders will be needed to discuss infrastructure planning and service details plus how the monitoring and reporting of data will be established. Surveys with the public should also be rolled out. These could gather information on any potential barriers or challenges that could be faced and any recommendations on application and operation. This can strengthen ties between the Government and the community and ensures public buy-in.

The following impact assessment is based off a UK government DEFRA impact assessment of three policy reforms known as the “Collection and Packaging Reforms” which estimates the introduction of “Consistent Collection” and statistical data taken from the Qatar Government

statistics authority. This assessment assumes that all of Qatar’s “domestic waste” is sorted and all organic waste is anaerobically digested. In the statistics domestic waste includes restaurant and other business waste as well as household. Some of the waste included in this scheme assessment may already be covered by existing composting or anaerobic digestion initiatives. This scheme is complemented by a Ministerial resolution for corporate and commercial institutions, hospitality, industrial and public stores to segregate their waste.

This scheme would need to be implemented in conjunction with a knowledge and awareness campaign to ensure the purpose of this waste segregation policy and its importance to the environment and human health are understood by the community.

IMPACT ASSESSMENT

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
ECONOMIC DEVELOPMENT			
REVENUE FROM SALE OF CARBON OFFSETS		QAR 34m per year	Estimated cost of offsets at the time of writing this report is between QAR29 and QAR36 per tonne (based on Baladna project).
COSTS OF WASTE COLLECTION	QAR 4.4m per year		<p>The UK government DEFRA impact assessment on the “Collection and Packaging Reforms” estimates the introduction of “Consistent Collection” of household waste to also cost businesses £31.7m (2023 – 2035), or an average of £26.4m each year.^[50] Assuming the cost is distributed evenly over the different types of waste collected, we can estimate its cost per tonne. In the UK, the cost of consistent collection of household waste including food waste for businesses responsible for waste management is circa £2 per tonne.</p> <p>Assuming similar costs in Qatar the average costs for local authorities to implement the new policy would be circa QAR 8.81 per tonne.</p>

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
			<p>In Qatar, waste figures are not disaggregated by businesses or households with “domestic waste” assumed to refer to both, this means collection services would cover both business and household waste.</p> <p>It is assumed that householders and businesses would not successfully sort all of their waste. According to UK government statistics, 2018, found that for organic waste only 48% was successfully recovered for collection collected for recycling According to the Qatari Planning and Statistics Authority, household waste as a whole was 1.5Mt tonnes in 2021 and 1.3Mt in 2020.^{[34][41]} Around 0.03Mt of this was composted in 2020. Data on composting is only available for 2020 so for the purposes of this analysis, we will use 2020 statistics to ensure consistency.</p> <p>60% of domestic solid waste is assumed to be organic. 1,298,850 tonnes of domestic solid waste was produced in Qatar in 2020 = 779,310 tonnes of organic waste.^[34] In addition, 250,494 tonnes of damaged food and slaughtered was sent to landfill in 2020.</p>
COSTS FOR WASTE MANAGEMENT FACILITY	QAR132m one off And an O&M cost of QAR 9m per year		<p>Some organic waste is already sent to the anaerobic digestion (AD) & composting plant at the DSWMC. It is said to be able to treat 750t of domestic and municipal waste per day or 273,750 tonnes a year.^[102]</p> <p>This assessment assumes that all the 494,305 tonnes of organic waste collected would otherwise go to landfill (although some of this is likely to already be treated in the existing plant).</p> <p>An additional two anaerobic digesters would be required (if they are the same capacity as the existing AD and composting plant) to treat all organic waste collected from the domestic waste. However, sewage and agriculture waste could also be treated but are not considered in this impact assessment.</p>

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
			<p>Each AD plant is different in terms of feedstocks, location, outputs, and technology employed, meaning an accurate cost can only be determined from a feasibility study. Large plants treating food waste can require pre-treatment systems which could cost in excess of QAR66m each. A total cost of QAR 132m has been assumed for the additional plants required.</p> <p>Assuming that operating and maintenance costs are 7.0% of the capital costs the annual cost is circa QAR 9 m. [103]</p> <p>It should be noted that in 2017 the Ministry for Municipality stated that an upgrade would be happening at the DSWMC and would include an additional AD and composting plant. Information on the size of this is not yet available.</p>
ORGANIC WASTE INFRASTRUCTURE PROVIDED TO ALL RESIDENTS OF QATAR	QAR 18m one off		<p>General waste is currently collected by the Municipality daily from homes.</p> <p>Estimated cost of infrastructure: number of housing units was 404,000 and number of buildings were 223,000 in Qatar in 2020. [104]</p> <p>The assumption has been made that bin infrastructure would be required for each housing unit and other buildings would require shared larger waste bin infrastructure in basements or designated outside locations close by.</p> <p>Typical cost of waste bin (wholesale) 120l = QAR 30 to QAR50.</p> <p>Estimated that would need 440,000 bins (one per building, includes spares) at QAR40 each</p> <p>Segregated waste collection schemes should already be in place for corporate and commercial institutions, hospitality, industrial and public stores so additional infrastructure for businesses would not be needed. [35]</p>

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
REVENUE RESULTING FROM DIGESTATE PRODUCED BY ANAEROBIC DIGESTION		QAR 193m per year	The UK market value of digestate was 111 - 143.8 euros (QAR433- QAR 558) per tonne in 2021.
BIO-GAS PRODUCTION THROUGH THE COMPOSTING OF HOUSEHOLD FOOD WASTE		99 million m ³ per year	<p>Food waste is highly biodegradable and has much higher volatile solids destruction rate (86-90%) than biosolids or livestock manure. As per conservative estimates, each tonne of food waste produces 150 – 200 m³ of biogas, depending on reactor design, process conditions, waste composition etc. [105]</p> <p>Considering the size of the proposed biodigesters, it is expected that the volume of biogas produced will be on the higher end (200m³).</p> <p>Organic waste available: 494,305 tonnes (based on earlier estimate)</p> <p>Therefore 99 million m³ of biogas could be produced each year (assumed to be at standard temperature and pressure).</p>
SOCIAL COST OF CARBON		QAR 1.125bn per year	Based on the UK's Green Book 2022, the social cost of carbon from its contribution to climate change is 1,065 QAR/tonne. Carbon reduction of 1.06MtCO ₂ e per year as calculated below. [12]
ENVIRONMENT DEVELOPMENT			
REDUCTION IN GHG EMISSIONS RESULTING FROM PRODUCING BIOGAS		1.06MtCO ₂ e per year	<p>65% of biogas (by volume) is assumed to be methane with the rest CO₂. [97]</p> <p>34,600,000 m³ would be Carbon dioxide = 63,500 tonnes of CO₂ assuming atmospheric conditions</p> <p>64,260,000m³ would be methane = 43,200 tonnes of CH₄ assuming atmospheric conditions</p> <p>Calculating the CO₂e from biogas (assuming that the biogas will all be later used for combustion).</p> <p>If the methane was not burned, 43,200 tonnes would be released into the atmosphere = 27.2 (GWP, AR6) x 43kt CH₄ = 1,175,040 tCO₂e released along with the 63.5ktCO₂e of CO₂. [106]</p>

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
OVERALL INCREASE IN RECYCLING AND DECREASE IN LAND USED FOR LANDFILLS		Not Quantified	In 2003 the UK implemented the Household Waste Recycling Act which meant every household in the country would have a recycling service on its doorstep – this has seen recycling rates increase to 46%. [107] Implementing the same type of law or policy in Qatar, providing residents with the infrastructure to segregate their waste at home (coupled with an awareness campaign) should have the same effect. It could even have a greater effect since the UK policy was introduced 20 years ago and people in general are now more aware of the need to recycle. By increasing the amount of food waste composted and used for biofuel and by encouraging domestic waste separation, Qatar would also significantly decrease the amount of land needed to expand its landfills.
DECREASE IN POLLUTION		Not Quantified	Decreasing the size of Qatari landfills will also lead to a reduction in overall pollution in the country.
HUMAN DEVELOPMENT			
CREATION OF NEW EMPLOYMENT OPPORTUNITIES		Not Quantified	Possible new employment opportunities (due to expected public and private investment in reprocessing). ^[50]
SOCIAL DEVELOPMENT			
ABILITY FOR QATAR TO REACH AND SURPASS THE GOALS SET OUT IN THE NDS 2		Not Quantified	By working to reduce food waste and also contributing to diversifying Qatar’s energy and economic reliance on oil and natural gas, Qatar can reach and surpass the goals set in the NDS 2.

EDUCATION AND KNOWLEDGE SHARING

PART 1: AWARENESS RAISING CAMPAIGN ON THE IMPORTANCE OF SEPARATING ORGANIC WASTE IN HOMES AND THE IMPLEMENTATION OF A KNOWLEDGE HUB.

POLICY DESCRIPTION

Sustainable development requires effective participation by all relevant groups and entities. [108] This assessment focuses on two areas, an awareness and education campaign on food waste segregation, and the creation of a knowledge sharing hub to bring together the relevant stakeholders in the waste industry and enable Qatar to be at the forefront of research and technology in the region.

A. An annual awareness raising campaign on the importance of separating organic waste in homes. This public awareness campaign would encourage individual citizens in Qatar to segregate their food waste from their other domestic solid waste so that it can be recycled. The campaign could be launched alongside the roll out of other policies and initiatives such as the organic waste composting facilities intervention, or an extended producer responsibility scheme. An extensive food waste campaign would be required to assist people in understanding the importance of segregation their food waste and its impacts on the environment.

The Ministry of Municipality joined the global campaign on curbing food waste, Recipe for Change in January 2022.^[109] and now that the Ministerial resolution on Sorting Solid Waste No. 170 is in force, a further awareness campaign on food waste segregation and its impacts will have more emphasis, especially as waste segregation is relatively new in Qatar. The Love Food Hate Waste, a government campaign in the UK started in 2007 by Waste and Action Resources

Programme (WRAP) is a dedicated campaign such as this. Implemented to reduce food waste. It works with strategic partners to deliver information on how to fight food waste at home. With a regularly updated blog covering guidance and tips, research and ideas. In addition, they host a yearly Food Action week. The awareness campaign could ideally be in three languages – Arabic, English and possibly Hindi (as Indian Nationals make up the largest percentage of the expat population)^[110]

B. The creation of an education and knowledge hub. This could be a stand-alone waste hub or as part of a central circular economy hub. The site would collate all existing information concerning food waste in Qatar such as research already completed, findings, gaps in the market, innovation, and advancements in technology. The hub could be designed to bring together stakeholders in this field to ensure there is one central location where information and case studies on the waste industry in the MENA region can be sourced. This hub could be run through either the government or a non-government entity however, if run through an already established education and research-based entity such as Qatar Foundation, it could be a logical evolution, fitting in with their already established mission and vision.

POLICY AIMS, OBJECTIVES AND INTENDED EFFECTS.

A. The aim of the awareness campaign is to bring the economic, environmental, social and human health impacts associated with food waste segregation to the attention and understanding of the community so that they are more inclined to segregate their food for recycling. It is envisioned that it could be rolled out should waste segregation at homes be introduced (as is currently happening for commercial buildings). Implementation of this campaign could lead to reduced food waste being landfilled, reduced emissions, the creation of revenue streams from waste and assist in reaching recycling targets.

B. The knowledge sharing hub aims to facilitate information sharing through universities, research centres, corporate and individuals and assist in gaining a greater understanding of food waste management in Qatar. Currently this information is generally held with the entity who is or has carried out the research or is designing new technology. If there was a single platform to hosts this information, it could reduce repetition of research and align findings. This could drive innovation, policy implementation and further research to ensure the country is at the forefront of the waste management industry both in the GCC and internationally. The policy aims to assist in meeting and surpassing Qatar's sustainability goals for the Qatar National Vision 2030.^[6]

POLICY ANALYSIS

A. The impact assessment is based on data from Qatar's Planning and Statistics Authority, local industry and a UK consumer engagement campaign's (Smart Energy GB) planning budget. This campaign was chosen as it is also a campaign aimed at changing mindsets and due to the limited budget planning data available for food campaigns. There are a number of potential issues with implementing this policy which will need to be considered when designing the campaign. These include the fact that waste segregation is not yet policy in Qatar. Should this be made policy it could then take time for the community to make waste segregation habit.

The large percentage of the population in Qatar is expat, made up of over a hundred different nationalities.^[111] Therefore, it can

be presumed that with people from so many different countries the levels of environmental awareness and the benefits of waste segregation will be varied. It will also be essential that the community are involved as much as possible to ensure greater trust. People need to know that their efforts to segregate waste are leading to recycling. Therefore, data on waste should be collated and shared.^[112] For all these reasons, it will be necessary to run this campaign throughout the year with regular updates which include actual recycling figures highlighting how the community is helping and benefitting the environment and human health. The collection and sharing of data from monitoring the waste is essential to not only give feedback but to also to focus awareness where it is needed most moving forward. A data collection policy intervention is included in a separate policy. The Qatar's OUN app from the Ministry of Municipality could be a potential support for sharing this information to the general public.^[113] This is an existing free app and could be a useful tool for providing the updated waste figures and benefits. Incentives to download and use this app however, could ensure greater use if this was implemented.

The campaign could include the introduction of market-wide levers including a digital media campaign, advocacy among businesses, thought leadership work and the generation of policy evidence and research. When converted to the Qatar context, the estimated cost is QAR 5m per year over 10 years.

B. Setting up and running a knowledge hub would have relatively low costs and could reap substantial benefits in terms of raising awareness within the region for circular economy issues. The hub could support broader outreach to both the public and experts in the region and would complement sustainability workshops. The net cost of the scheme would be QAR1.8m each year over a 10-year period to run including to set up an online hub with a dedicated website and researchers to collate all materials.

The impact assessment has been based on information available on the European platform and other education and awareness programmes. This policy recommendation is for a food and waste knowledge hub however, as detailed in the cross-cutting policy section the implementation of a circular economy knowledge hub could be a more complete approach, including many sectors. In other countries a circular economy knowledge hub has been found to be an effective way of sharing lessons learned, case studies and sources of support.^[114] However, should it be decided to implement a food and domestic waste knowledge hub independently to a circular economy hub the cost/benefit estimates are detailed below. Should the circular economy hub be implemented the food and waste hub would become a part of this with its own linked website and the below costs would reduce to website creation and maintenance only. In order to implement this, it would need to be agreed which organisation (s) could be best suited to host, managed and finance the knowledge hub. It should then be decided whether this will be a standalone waste knowledge hub or part of a circular economy hub. A kick-off meeting involving as many stakeholders in the industry as possible would be required to detail the content necessary and how to obtain this. Should the hub be implemented by a non-government entity such as Qatar Foundation endorsement from the government could be beneficial.

IMPACT ASSESSMENT A:

AWARENESS RAISING CAMPAIGN ON THE IMPORTANCE OF SEPARATING ORGANIC WASTE IN HOMES.

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
ECONOMIC DEVELOPMENT			
MARKETING (INCLUSIVE OF WEBSITE CREATION)	QAR1.8m per year		<p>Smart Energy GB estimate that the costs of marketing (including creative development, digital production, website development, social media and marketing partnerships) for 2022 to be £26m.</p> <p>This campaign is targeted at all domestic houses, and the number of UK domestic housing estimated to be 25m^[115]. £26m/25m = £1 per dwelling QAR4.4). Qatar is estimated to have 404,000 dwellings.^[41]</p> <p>However, given that some of these costs will be fixed, and will not scale with housing (e.g., Costs of branding and website) it is assumed that overall costs could be higher than the figure calculated here.</p>
COMMUNICATIONS	QAR141,400 per year		<p>Smart Energy GB estimates that the costs of communications (including public affairs, policy and PR) for 2022 to be £2m.^[116] This campaign is targeted at all domestic houses, in the UK domestic houses in 2021 is estimated to be 25m.^[115]</p>
STAFF	QAR1.62m to employ 5 people per year		<p>This UK campaign had 69 staff members.^[116] In 2021 there were an estimated to be 25m UK households.^[115] However, Qatar has a much smaller number of households, estimated at 404,000.^[41] Therefore, it is assumed that fewer staff will be required. Scaling by households that would require around 1 person.</p> <p>However, given economies of scale and the fact that it is more efficient to run a campaign at a large scale, and that this campaign will require regular updating it is assumed that more staff will be needed. This impact assessment therefore assumes the cost of 5 staff members. The estimated Qatar salary of an employee working in design and creative services is QAR27,000 a month.^[117]</p>

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
ECONOMIC DEVELOPMENT			
ICT	Assume QAR 150,000 one off cost QAR 5,000 per year for website maintenance		Based on a quote for a UK website: £30,000-40,000 set up costs and engagement with designers, website developer etc. On-going maintenance would be around £1,000 a year.
ENVIRONMENTAL DEVELOPMENT			
REDUCED GHG EMISSIONS FROM LANDFILLING ORGANIC WASTE (INCLUDING FOOD WASTE)		Not quantified	This campaign could contribute to the segregation of waste and reduction of emissions from food waste.
COMMUNITY FOOD WASTE SEGREGATION LEADING TO CLEAN / DRY OTHER WASTES THAT ARE EASIER TO RECYCLE		Reduced waste to landfill (Not Quantified)	The remaining waste would be dry and therefore easier to segregate for recycling by the DSWMC or other recycling companies. Plastic, cardboard/paper, metals and glass could be the recovered materials for reuse.
HUMAN DEVELOPMENT			
AWARENESS ON FOOD WASTE		Not quantified	Potential to reduce food waste. Segregating food highlights how much people waste.
SOCIAL DEVELOPMENT			
JOB CREATION		5 people	<p>This UK campaign had 69 staff members.^[116] The national campaign run in the UK by Smart Energy UK targeted UK households, of which in 2021 there were an estimated to be 25m households.^[115] However, Qatar has a much smaller number of households, estimated at 404,000.^[41] Therefore, it is assumed that fewer staff will be required. Scaling by households that would require around 1 person.</p> <p>However, given economies of scale and the fact that it is more efficient to run a campaign at a large scale, it is assumed that more staff will be needed. This impact assessment therefore assumes the cost of 5 staff members.</p>
QATARI NATIONAL FOOD SECURITY STRATEGY		Not Quantified	Awareness on amounts of food waste can also strengthen the Qatari National Food Security Strategy.

IMPACT ASSESSMENT B:
KNOWLEDGE SHARING HUB.

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
ECONOMIC DEVELOPMENT			
LIMIT REPLICATION OF RESEARCH – STREAMLINE USE OF RESEARCH FUNDS		Not quantified however, enable Universities /Research Centre to utilise funding more efficiently - no duplication of work	Building on the implementation of waste infrastructure and an awareness campaign, the Hub can collate all existing information concerning food waste in the country. Research that has already been carried out, findings, gaps in the market and bring together stakeholders. Qatar Foundation who already host research, development and innovation Hubs could be the entity to support this. Like the Qatar Green Building Council (QGBC, now Earthna) who used to host interest groups on waste, energy, and hospitality sectors for example. A Hub website where all the available data can be found is key.
WEBSITE CREATION	QAR 150,000 for website QAR 5,000 per year for website maintenance per year		£30,000-40,000 set up costs and engagement with designers, website developer etc. On-going maintenance would be around £1,000 a year. Caveat - this is also the cost to set up a Circular Economy Hub (Cross-cutting policy). If it was agreed to implement a Circular Economy Hub this Waste Hub would become an extension to it and costs for the waste section would reduced.
STAFF FOR COLLATING RESEARCH, STAKEHOLDERS AND EXISTING AVAILABLE DATA.	QR163,800 per year		Consultancy would be required initially to collate all existing information on food waste to date and establish a baseline of the current situation. A database of all stakeholders can be created and kick-off meetings to introduce the plans would be necessary. Approximately 3 months' work for two environmental consultants. Est. salary QAR27,000 per month x 3months = QAR81,000. X 2 researchers = QAR 163,800.
STAFF TO RUN THE HUB	QAR1.62m per year		This impact assessment assumes the cost of 5 staff members to run the secretariat. Estimated Qatar salary of staff member is QAR 27,000/month x 12 months x 5 staff = QAR 1.62m per year. ^[51]

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
ENVIRONMENTAL DEVELOPMENT			
KNOWLEDGE AND EDUCATION		Not Quantified	An informed community who understands the importance behind the policy implementation will help reduce GHG emissions from waste, help improve air quality and drive further research and innovation in the sector. WRAP saw 42.0K visits to their website in the month of January 2023.
HUMAN DEVELOPMENT			
COMMUNITY INVOLVEMENT		Shared information, Community ownership of issue (Not Quantified)	Having access to a policy hub brings the issue to the attention of the community. Those with an interest in the field will help drive it forward and push for further research and development building a sense of pride in the community.
SOCIAL DEVELOPMENT			
BUILDING KNOWLEDGE		Not Quantified	Building on the country's knowledge base and encouraging collaboration between academia and industry to drive forward improvements on managing waste in the future.
JOB CREATION		5 people	This intervention assumes that a significant proportion of the content generation would be done through the Contact Group volunteers and that this work would be overseen by a secretariat of 5.

EDUCATION AND KNOWLEDGE SHARING INITIATIVES PART 2: DONATION OF FOOD WASTE

POLICY DESCRIPTION:

The donation of surplus food in Qatar, specifically, the charitable donation of surplus food within the retail and hospitality sectors through a national food collection and redistribution programme.

The scheme would encourage the charitable donation of surplus food within the retail and hospitality sectors through a national food collection and redistribution programme. It does not cover the donation of surplus food from households as this was deemed unsuitable due to logistical reasons. This would be implemented alongside an awareness campaign targeted at both the hospitality sector and the domestic sector. It would tackle food waste reduction and detail the implementation of a national food collection and redistribution programme.

POLICY OBJECTIVES AND INTENDED EFFECTS:

According to UNEP, in 2021, 72,418 tonnes of food were wasted by all Qatari food services and hotels.[78] This policy aims to foster the collection and redistribution of surplus food to those in need through the implementation of a dedicated, fully operational programme. Coupled with an awareness campaign highlighting food waste and how to donate surplus food. The effects of implementing this could be: an informed community and hospitality sector on food waste reduction and why it is important, an efficient collection and redistribution programme which can supply food to those most in need, a reduction in emissions as a result of lower quantities of landfilled food waste and a reduction in overall expenditure on food.

POLICY ANALYSIS

The implementation of this policy is set to have a net economic benefit of around QAR22m per year if the national programme for the collection and redistribution of surplus food within the retail and hospitality sectors is implemented. This

has the potential to achieve a reduction of up to 0.0013MtCO₂e each year.

Food donation has dropped significantly in Qatar since 2015 from over 700 tonnes per year to just over 100 tonnes in 2020. [41] It is not understood why there has been such a drop in donations however, this could be due to logistics, staffing or funding support. Two organisations have managed to donate food, the Qatari Hifz Alnaema food bank redistributed 102 tonnes of surplus food in 2020, and the Wa'hab charity has also previously redistributed an average of 66.6 tonnes of food a year. [118] [41] By implementing a national collection and redistribution programme within the retail and hospitality sectors which is fully staffed and has the means to transport food, Qatar could increase its food surplus distribution by an additional 2,072 tonnes each year.

Based on figures the UK, it is estimated that Qatar could redistribute between QAR 29m worth of surplus food, or 5 million meals. This, in turn, could bring significant health benefits for the Qatari population, since it could enable the distribution of healthy and balanced meals across schools and to people more vulnerable to food shortages/stress, or to those less able to access adequate food and nutrition, thereby addressing some of the issues linked to the rise in obesity and healthcare expenses for diet-related medical conditions.

In order to implement this national programme discussions between the Government and existing food donation charities will be required to develop a strategy to move forward. It is envisaged that financial assistance will be required from the Government to set up the programme initially with the requirement to employ staff and collection vehicles.

The following assessment is based on a) data collected from a 2021 assessment done by UK charity WRAP and b) the Annual Report of UK leading food distribution charity FareShare. WRAP estimated that presently only 4.6% of the total food waste from retail and hospitality in the UK, namely, 64,000 tonnes of food, is redistributed via charities.[119] According to WRAP this was equivalent to £201m or 154.3m meals.[119] WRAP's estimate with regards to the food redistribution capacity of the UK retail and hospitality sectors via charities has been adapted to the Qatari context and data.

FareShare's 2021 budget for running its food surplus donation programme with the British

retail and hospitality sectors has been adapted to estimate the costs of running a similar programme in Qatar to enable the retail and hospitality sectors to donate surplus food that could otherwise go to waste. The assessment has not taken into consideration the donation of surplus food waste from homes due to logistical purposes. However, the awareness campaign that can accompany the implementation of the donation programme can be designed to give people the information about this programme so that they could utilise these services should they have quantities of surplus, fit for consumption, food.

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
ENVIRONMENTAL DEVELOPMENT			
MONEY SAVED IN REDISTRIBUTED FOOD		QAR 29m each year	According to UNEP, the total food waste production in the UK in 2021 was 5,199,825 tonnes, of which the combined waste from hospitality and retail represented 1,397,875 tonnes.[78] According to an assessment done by UK WRAP, the amount of surplus redistributed in 2021 was over 106,000 tonnes, worth over £330m and the equivalent of 253m meals.[119] WRAP found that, in 2021, 49% of the food redistributed by charities came from the retail sector, and 8% of it now comes from the hospitality sector. In 2021 the charitable sector redistributed more than 64,000 tonnes of surplus food, equivalent to £201m or 154.3m meals.[119] On the basis of WRAP's estimate of 306,000 tonnes of surplus food being redistributable, this means that only 21.9% of total food waste is redistributable in the UK.
			According to UNEP, in 2021, 72,418 tonnes of food were wasted by all Qatari food services and hotels. It is important to caveat that the overall waste production by the hospitality sector might now be significantly higher, particularly as a result of the increase in tourism in Qatar following the FIFA World Cup in December 2022.

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
ECONOMIC DEVELOPMENT			
			<p>If we assume that less food will be redistributable in Qatar than in the UK as a result of the different weather conditions, we can presume that significantly less than 20% of total food surplus from retail and hospitality would theoretically be redistributable by charities via donations. If presently only 4.6% of the total food waste from retail and hospitality in the UK is redistributed via charities, the figure in Qatar is likely to not be as high. 4.6% of the combined waste of the Qatari retail and hospitality industry would equate to 3,330 tonnes of redistributed surplus food. A more realistic figure of 3% would be circa 2,172 tonnes. Taking into account that the Qatari Hifz Alnaema food bank only redistributed circa 100 tonnes of surplus food in Qatar in 2020, compared to over 700 tonnes in 2015 [41], it is evident that implementation of the programme would achieve a significant increase in food redistribution.</p> <p>An extra 2,072 tonnes of food could be redistributed. According to WRAP, in 2021 the UK charitable sector redistributed more than 64,000 tonnes of surplus food, equivalent to £201m. [119] Assuming similar prices for food, we can also argue that Qatar could redistribute QAR 28.5m of surplus food.</p>
STAFF COSTS TO RUN A FOOD REDISTRIBUTION PROGRAMME	QAR 6m per year		<p>FareShare is leading food redistribution charity in the UK. Alone, in the fiscal year 2021-2022 it redistributed 53,893 tonnes of food. [120] In 2021 FareShare relied on a team of 170 full-time staff members and 4,800 volunteers to distribute 53,893 tonnes.[120] On average, a person was necessary every 11 tonnes of food. Assuming that, not differentiating among administrative and non-administrative staff, one person would be necessary for every 11 tonnes of redistributed food, it is arguable that Qatar would need 200 people (for 2,072 tonnes of redistributed food).</p> <p>Assuming that 90% of these people were volunteers and 10% were paid staff (and not volunteers), and that they are paid the average salary for someone working in cultural education (circa QAR25,000 a month = QAR300,000 a year). These staff could also run an awareness campaign.</p>

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
NETWORK SUPPORT COSTS TO RUN A FOOD REDISTRIBUTION PROGRAMME	QAR 2.1m per year		<p>In 2021-22 fiscal year FareShare spent £12.7m for in network support costs, for the total redistribution of 53,893 tonnes of food.[120]</p> <p>In order to successfully redistribute an extra 2,072 tonnes of food each year the existing surplus food redistribution framework in Qatar would initially need to be significantly scaled up, leading to increased initial costs. Taking into account FareShare's 2021 network support costs, it is arguable that upwards of QAR 2.1m could be necessary to redistribute food each year, following an initial additional investment.</p>
SOCIAL COST OF CARBON		QAR 1.5m per year	Based on the UK's Green Book 2022, the social cost of carbon from its contribution to climate change is QAR 1,065 per tonne. [12]
ENVIRONMENTAL DEVELOPMENT			
EMISSIONS SAVINGS		0.0014MtCO2e per year	As stated above, the Qatari Hifz Alnaema food bank only redistributed 100 tonnes of surplus food in Qatar in 2020. [41] The implementation of the programme could achieve a significant increase in food redistribution. 2,172 tonnes of food could be redistributed. Assuming that most of the food waste in Qatar is landfilled and taking into account the UK government CO2 conversion factors. [82]
HUMAN DEVELOPMENT			
BETTER NUTRITION		Not Quantified	Donating food to the vulnerable in Qatar can help to improve the overall nutrition across the population and combat medical conditions such as obesity, thereby relieving pressure on the national healthcare system.
LOWER COSTS FOR THE HEALTHCARE SYSTEM AS A RESULT OF A DECREASE IN DIET-RELATED MEDICAL CONDITIONS			
SOCIAL DEVELOPMENT			
QATARI NATIONAL FOOD SECURITY STRATEGY		Not Quantified	Collecting surplus food and preventing it from becoming food waste can also strengthen the Qatari National Food Security Strategy.

DATA COLLECTION

POLICY DESCRIPTION

This policy aims to improve food waste tracking practices in Qatar through the mandatory digitalisation of waste tracking. It is a policy that is designed to be used in tandem with other food waste policies, as it cannot be used to strengthen the circularity and sustainability of Qatar's practices alone. However, it can be used to improve decision-making and the development of targeted policies in Qatar. It can also be used as a means of monitoring the success of the other recommended policies.

POLICY OBJECTIVES AND INTENDED EFFECTS.

This policy aims to track the production of food waste more efficiently across the entire supply chain in Qatar, tracking food waste from the moment it enters Qatar to the moment it becomes waste, either composted or landfilled.

According to UNEP, the total food waste production in Qatar in 2021 was 376,425 tonnes of which household waste represented 267,724 tonnes, and the combined waste from the retail and hospitality sectors represented 108,701 tonnes.[78]However, according to the Qatari Planning and Statistics Authority, household waste as a whole was 1,514,868 tonnes in 2021 and 1,298,850 in 2020. [34] [41] Assuming that 57%-60% of all household waste is organic waste, we can presume that circa 50% of all household waste is food waste, more specifically, circa 757,434 tonnes in 2021. [34] For the purposes of this analysis, we will use 2021 statistics to ensure consistency across the impact assessment.

A centralised, standardised, transparent approach to data collection and dissemination was raised as a priority and could allow Qatar to take a more knowledge based, data driven approach to policy development, as well as to showcase progress.

POLICY ANALYSIS

The implementation of mandatory digital waste tracking for household, retail and hospitality food waste could cost QAR 0.67m per year

over a 10-year period. Initial costs (mostly for businesses) stemming from the transition to a digitalised food waste tracking system could be around QAR 1.9m in the first year. Following the transition, costs could stabilise at around QAR 0.5m each year. Whilst it is hard to quantify the monetary net benefits, which will depend on the policies which digitalised food waste tracking is paired with, the adoption of this policy could also most likely lead to numerous non-monetised benefits, including the reduction of avoidable errors, improved data for investment decisions, efficiency savings, and improved business experience. Further, the implementation of this policy could lead to a safer and cleaner environment, and produce environmental benefits associated with improved resource efficiency and reduced environmental damage.

In order to implement this, it will firstly need to be made policy by the Government and as the policy is regulatory in nature should be managed at a government level.

The following impact assessment is based off 2021 impact assessment carried about by the UK government's Department for Environment, Food and Rural Affairs (DEFRA) on the "Introduction of Mandatory Digital Waste Tracking". [121] It breaks the costs and benefits down into monetised and non-monetised costs and benefits for all the "main affected groups". DEFRA's estimates with regards to the costs and benefits of the mandatory digital tracking of food waste have been adapted to the Qatari context and data.

Alone, the implementation of this policy is unlikely to bring any economic benefit to Qatar, since in the UK it will primarily impact tax policy. However, relying on digital food waste tracking can provide a foundation for the implementation of other policies in the country which address food waste and enable its reduction. In turn, this can bring multiple economic and non-monetised benefits (see other policies of the Annex).

IMPACT ASSESSMENT

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
ECONOMIC DEVELOPMENT			
TRANSITION COSTS (FOR BUSINESSES AND PERMITTED WASTE SITES)	QAR 1.9m one-off cost		<p>According to the Qatari Planning and Statistics Authority, non-industrial waste as a whole was 1,514,868 tonnes in 2021.^[34]</p> <p>Assuming that 60% of this waste is organic waste, circa 908,921 tonnes in 2021. For the purposes of this analysis, we will use 2021 statistics to ensure consistency across the impact assessment.</p> <p>Regulators will face costs associated with familiarisation and training (£0.1m or QAR 0.44m). Businesses will face transition costs as well, with the estimated transition costs for permitted waste sites are expected to amount to £66.5m for all waste, for a total of £0.37 per tonne (QAR 1.62).^[121]</p> <p>Whilst the overall transition costs will also be different as a result of the different waste framework currently in place, we can assume a similar amount in paperwork and software etc. On this basis, it will cost Qatar at least QAR 1.5m in the first year in transition costs to digitally track food waste.</p>
AVERAGE ANNUAL COSTS AFTER THE TRANSITION	QAR 0.48m per year		<p>According to the DEFRA Impact Assessment for the UK, following the transition year, each year £21.8m (2.9%) will be spent for the tracking of all waste, of which an estimated £632,000 will be spent in transitioning costs for the tracking of food waste (£0.12 per tonne or QAR 0.53).^[121]</p> <p>Although there will be differences in the average costs as a result of the different context, we can assume QAR 481,728 per year.</p>

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
ECONOMIC DEVELOPMENT			
IMPROVED DATA FOR INVESTMENT DECISIONS		Not Quantified	According to the DEFRA impact assessment, within the UK the key non-monetised benefits for businesses are reduced avoidable errors, improved data for investment decisions, efficiency savings, and improved business experience. ^[121] We have assumed similar beneficial outcomes could apply to Qatar.
EFFICIENCY SAVINGS		Not Quantified	
IMPROVED BUSINESS EXPERIENCE		Not Quantified	
ENVIRONMENTAL DEVELOPMENT			
SAFER AND CLEANER ENVIRONMENT		Not Quantified	DEFRA estimates that the implementation of this policy will lead to a safer and cleaner environment, and produce environmental benefits associated with improved resource efficiency and reduced environmental damage. ^[121]
IMPROVED RESOURCE EFFICIENCY		Not Quantified	
REDUCED ENVIRONMENTAL DAMAGE		Not Quantified	
SOCIAL DEVELOPMENT			
IMPROVED HEALTH AS A RESULT OF A CLEANER ENVIRONMENT		Not Quantified	A safer and cleaner environment will also have positive impacts for human health.

REGULATED PROCUREMENT

POLICY DESCRIPTION

This policy will require certain imported commodities to undergo due diligence in order to ascertain that these commodities have not been produced on deforested or degraded land and that they have been produced in accordance with the laws of the country of production. These additional due diligence requirements are applied across a range of high-risk commodities which are the main drivers of the expansion of agricultural land and deforestation. The choice of commodities is based on the EU's Regulation for deforestation-free products which includes palm oil, cattle, soy, coffee, cocoa and maize. If either of the two requirements is not met, then these products cannot be imported into Qatar and cannot be sold on the Qatar market.

POLICY OBJECTIVES AND INTENDED EFFECTS

This policy aims to ensure deforestation-free supply chains for all imports of these high-risk commodities entering Qatar. As a significant proportion of Qatar's food is imported, this will enable significant reductions in deforestation, with subsequent reduction in CO2 emissions and benefits for maintaining biodiversity. Furthermore, this policy develops stricter traceability obligations for high-risk commodities being imported into Qatar. As the due diligence system will require importers to ascertain relevant information on the country and area of production of the commodities they intend to place on the Qatari market, thereby enabling increase transparency for further monitoring or certification.

POLICY ANALYSIS

There is limited data on the number of businesses in Qatar that would be subject to this policy and so costs could vary significantly. It is estimated that the net economic benefits each year of QAR 118m (in one-off compliance costs for operators linked to the establishment and operation of the due diligence system).

The recurring costs are split between QAR2.2m - QAR33.3m for importers and QAR 460,000 in annual enforcement costs (including staffing

costs) for the Qatari government to adopt a due diligence system. Although the policy will also entail costs for third countries it will bring significant benefits in the form of a reduction in emissions of 130ktCO2 per year, and a reduction in 2m hectares of deforestation globally. There will also be significant benefits in terms of human rights and biodiversity protection. Adopting this policy could also attract more international finance as investors are keen to ensure that their portfolios are ESG aligned as most lenders require minimum ESG standards to be met.

The following impact assessment is based on the impact assessment conducted by the European Commission for the Regulation to curb EU-driven deforestation and forest degradation. The research conducted by the EU has been adapted to the Qatari context in order to provide an estimate of the costs and benefits of implementing this policy in Qatar.

IMPACT ASSESSMENT

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
ENVIRONMENTAL DEVELOPMENT			
BIODIVERSITY GAIN		Not quantified	The impact on biodiversity is difficult to quantify. Over one million species are threatened with extinction globally. Land use change, including deforestation, is the main driver of biodiversity loss on land. A 2016 analysis, based on the Nature Red List of Threatened Species by the International Union for Conservation of Nature (IUCN), estimated that around 11,738 species were threatened by logging, crop farming, livestock farming and timber plantations. ^[122] It is to be expected that this intervention will reduce this kind of forest damage and will therefore have a positive impact on biodiversity.
GHG EMISSIONS REDUCTIONS	130ktCO2 per year		In 2019 Qatar imported: 0.03Mt of soy imported, 0.02Mt palm oil, 0.02Mt of bovine, 0.01Mt of cocoa (Cocoa products of concentrated liquid, chocolate, cocoa powder), 0.004Mt of coffee, 0.01Mt of maize. ^[123] In the EU, importing 81Mt of high deforestation risk commodities resulted in 102MtCO2. Assuming the same conversion factors for volume of import of embodied deforestation to CO2 emissions as calculated in the EU impact assessment, implementing this policy in Qatar could lead to a 130ktCO2 savings per year. ^[122]
ECONOMIC DEVELOPMENT			
ONE OFF COMPLIANCE COSTS FOR OPERATORS LINKED TO THE ESTABLISHMENT AND OPERATION OF THE DUE DILIGENCE SYSTEM	Assuming mid-point cost of QAR 187,000 one-off cost		Operators may incur costs where they may need to support their current supplier base in demonstrating or transitioning to deforestation-free sourcing. ^[122] EU operators are expected to incur both one-off costs to set up the due diligence system and recurrent costs to maintain and operate the system. One-off costs may include components such as developing and instituting a due diligence policy, procuring and installing necessary IT systems, informing and training staff and supply chain partners.

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
			There are very few studies providing information on one-off costs of setting up the EUTR due diligence system. One of them provides a range between EUR 5,000 and 90,000 per operator, which is comparable with the values given for other due diligence processes. This range provides a reasonable estimate of the costs that companies could incur to set up the due diligence system. The level of costs for a particular company will depend on their specific characteristics and supply chains. ^[122] The one-off costs for Qatari businesses are assumed to be the same as those in the EU.
RECURRING COSTS FOR IMPORTERS LINKED TO THE ESTABLISHMENT AND OPERATION OF THE DUE DILIGENCE SYSTEM	Assuming the mid-point QAR 18m per year		Costs to operators in carrying out due diligence will likely vary by commodity, as will the possibility of switching to lower-risk supply chains. ^[122] Where production is concentrated in a small number of countries which are associated with commodity-driven deforestation, there may be limited options to meet Qatari demand by switching to lower-risk countries (beef, soy and the majority of timber have more widespread production). For longer and more complex supply chains, there are likely to be additional costs when systems to trace to farm/forest/plantation-level are lacking. The proposed improved due diligence systems would also require operators to take action to ensure traceability and transparency. ^[122] In addition, there are likely to be administrative costs linked to risk mitigation in the event of identified deforestation risk. As regards recurrent costs of the due diligence system, the overall costs for importers of EUTR products is estimated as a range between 0.29% and 4.3% of the value of the imports. ^[122] We assumed that the recurring costs in Qatar resulting from the establishment and operation of the due diligence system would be the same. Recurring costs for soy imports: QAR149,437 - 2. Recurring costs for palm oil imports: QAR 175,682 - 2.6m. Recurring costs for beef imports: QAR975,618 - 14.46m. Recurring costs for cocoa imports: QAR 493,626 - 7.32m. Recurring costs for coffee imports: QAR282,069 - 4.18m. Recurring costs for Maize imports: QAR166,378 - 2.467m. ^[123]

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
ENFORCEMENT COSTS (INCLUDING STAFFING COSTS)	QAR 1.8 million per year		<p>The establishment and operation of the due diligence system will also entail costs of implementation and enforcement for Member States authorities, who, as in the case of EUTR, would be tasked with inspecting and ensuring that the operators have appropriate due diligence systems in place.^[122]</p> <p>The costs for authorities of EUTR was estimated on the basis of the data reported by Member States.^[122] Assuming a similar proportion between full time equivalent staff (FTEs) and import value to that calculated for the EU, we can estimate the enforcement costs of the deforestation due diligence regulation for Qatar. On the basis of the EU costs, we can estimate the proportion to be circa 1 person per 134.3m of imports (4,300m of beef imports require 32 people to enforce).</p> <p>Therefore, Qatar will need: 0.4 people to oversee the imports of QAR 51.53m of soy. 0.45 for the imports of QAR60.58m of palm oil. 3.5 for the import of QAR336.418m of beef. 1.3 for the import of QAR170.216m of cocoa. 0.7 for the import of QAR97.265m of coffee. 0.4 for the import of QAR52.375m of maize.^[123]</p> <p>On the basis of these calculations, Qatar will need about 6 people to oversee the enforcement of the deforestation regulation. Estimated Qatar salary of staff member is QAR 25,000 a month = 1.8 million per year.</p>
COSTS TO OPERATORS AND SUPPLIERS IN THIRD COUNTRIES	Not quantified		<p>The application of the deforestation regulation will lead to costs for third party states ^[122] often in the form of decreased exports as a result of Qatar changing its supply chains. Impacts in third countries may vary depending on operator size and stage in the supply chain. Operators in third countries, including smallholders, could face costs to develop or implement systems to allow Qatari operators to comply with the new requirements, where they do not already have systems in place. These costs could be passed through the prices of products.^[122]</p>

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
INCENTIVES FOR THE DOMESTIC PRODUCTION OF FOOD COMMODITIES	Not quantified		As stated in the EU impact assessment, it is likely that especially in the initial transition phase to a due diligence system greater pressure will be put on the domestic production of food commodities. This will likely require domestic incentives to boost food production. ^[122]
SOCIAL COST OF CARBON	QAR 138m per year		Social cost of carbon is 1065 QAR/t. ^[12]
HUMAN DEVELOPMENT			
JOB CREATION (WITHIN THE QATARI GOVERNMENT)		6 people	As mentioned above, Qatar will need about 6 people to oversee the enforcement of the deforestation regulation.
JOB CREATION (AMONG OPERATORS)		Not quantified	In terms of employment, the policy options are expected to positively affect the competitiveness of relevant sectors and specific operators within these sectors which will result in the creation of new jobs in operators applying compliant production processes, and a loss of jobs for operators applying non-compliant production processes. New jobs will likely be created related to compliance with the new requirements for operators placing products on the EU market. ^[122]
SOCIAL DEVELOPMENT			
HUMAN RIGHTS PROTECTION IN THIRD COUNTRIES		Not quantified	The proposed policy options will require products to be compliant with both deforestation-free criteria and the laws of the country of production, thereby allowing to assess whether the rights of vulnerable communities such as indigenous people and local communities have been respected and upheld in the country of production. ^[122]
SENSIBILISATION OF THE QATARI POPULATION ABOUT THE IMPACT OF DEFORESTATION		Not quantified	<p>The adoption of a due diligence system which acknowledges the impact of deforestation on the plant will also help to sensitise the Qatari population with regards to environmental issues and the relationship between global supply chains, climate change, and biodiversity.</p> <p>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).</p>

CAMPAIGN TO PROMOTE PRIDE IN NATIONALLY GROWN FOOD

POLICY DESCRIPTION

A campaign to promote pride in nationally grown food compliments the education and awareness intervention. This campaign would involve the creation of its own dedicated website which could link to the food waste hub (or circular economy hub) for a more holistic approach.

POLICY AIMS, OBJECTIVES AND INTENDED EFFECTS.

This campaign would build on the work of the “Premium Qatari Vegetable” marketing campaign. This campaign was launched by the Ministry of Municipality and Environment (MME) in cooperation with the Ministry of Commerce and Industry (MoCI) in January 2017.[124] This campaign aims to continue to grow awareness of the economic, environmental, social and human health impacts associated with nationally grown food to the community. It can also deliver a targeted consumer engagement campaign to encourage residents to make more sustainable choices with their food.

Implementation of the campaign could assist in raising awareness and encourage people in Qatar to take pride in the produce that has been locally grown. The campaign could cover benefits from fresher food which tastes better due to less preservatives and being harvested when ripe. It could address the longer shelf life and less packaging leading to less waste, support for local employment, increased food security, reduced emissions from reduced transportation, and reduced costs as less transportation/handling/import costs. The campaign could include the introduction of market wide levers including a digital media campaign, advocacy among and businesses, thought leadership work and the generation of policy evidence and research. Implementation of this campaign could lead to emission reductions as a result of lower quantities of food waste entering landfill and less transportation of food. Economic benefits could come from reduced imports and support of the local market.

POLICY ANALYSIS

This policy could have a net cost of QAR 5m each year to implement, while annually benefitting the country in terms of food security, reduced food waste, reduced greenhouse gas emissions potentially improved health as a result of residents eating more locally grown as opposed to imported produce.

Very little food is wasted at the customs and transit stage (according to Qatar National Food Security Strategy).[38] Most of the savings in emissions that can be made from the food sector come from the choice of food type that is consumed (for example meat vs vegetarian diet) and production (for example, the use of pesticides) rather than transport emissions. There are, however, other benefits in choosing locally grown food including: support of the local farming industry enabling expansion, health benefits from fresher food which contain less preservatives, less packaging, less food and packaging waste, support for the local community and the economy and improved food security for the country. This means that this intervention is likely to have a low impact from an environmental perspective but higher for human impacts.

This pride in nationally grown food could be either a government awareness campaign continuing on from their previous campaign in 2017 on Premium Qatari Vegetables or it could be implemented through the entity responsible for the food waste hub (or circular economy hub). Finance for the campaign could most likely come from Government given that it is a national campaign and related to food security.

The following assessment is based on the data collected from Smart Energy GB’s consumer engagement budget for 2022, which details the anticipated budget required for running a consumer engagement campaign to try to change behaviour. Costs of running a similar campaign in Qatar to increase awareness of the benefits of locally grown food can be applied to this as both are consumer engagement campaigns.

IMPACT ASSESSMENT

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
ECONOMIC DEVELOPMENT			
MARKETING (INCLUSIVE OF WEBSITE CREATION)	Cost QAR1.8m per year		<p>Assuming that the costs per person in Qatar are similar, the campaign is based on the Smart Energy GB estimate that the costs of marketing (including creative development, digital production, website development, social media and marketing partnerships) for 2022 would be £26m.</p> <p>This campaign is targeted at all domestic houses, the number of UK domestic housing is estimated to be 25m.^[115]</p> <p>Qatar is estimated to have 404,000 dwellings^[41] = QAR 1.8m per year.</p> <p>This campaign is targeted at all domestic houses, and the number of UK domestic housing estimated to be 25m^[115]. £26m/25m = £1 per dwelling QAR4.4). Qatar is estimated to have 404,000 dwellings^[41]. = QAR 1.8m per year.</p> <p>However, given that some of these costs will be fixed, and will not scale with housing (e.g., Costs of branding and website) it is assumed that overall costs could be higher than the figure calculated here.</p>
COMMUNICATIONS	QAR141,400 per year		<p>Smart Energy GB estimates that the costs of communications (including public affairs, policy and PR) for 2022 to be £2m.[116] This campaign is targeted at all domestic houses, in the UK domestic houses in 2021 is estimated to be 25m. [115] = £0.08 per dwelling (QAR 0.35). Qatar is estimated to have 404,000 dwellings [41] = QAR141,400 per year.</p>

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
STAFF	QAR1.62m per year (to employ 5 people)		<p>This UK campaign had 69 staff members.^[116] The national campaign run in the UK by Smart Energy UK targeted UK households, of which in 2021 there were an estimated to be 25m households.^[115] However, Qatar has a much smaller number of households, estimated at 404,000.^[41] Therefore, it is assumed that fewer staff will be required. Scaling by households that would require around 1 person.</p> <p>However, given economies of scale and the fact that it is more efficient to run a campaign at a large scale, and that this campaign will require regular updating it is assumed that more staff will be needed. This impact assessment therefore assumes the cost of 5 staff members. The estimated Qatar salary of an employee working in design and creative services is QAR27,000 a month.^[117]</p>
TRAINING AND DEVELOPMENT	QAR 53,520 per year		Smart Energy GB estimate training and development costs to be £168,600 in 2022 for 69 staff members. This includes full training and development costs for all staff including 1-1 training, group training and internal planning meetings. We can therefore estimate the costs of training and development in Qatar to be £2,442 per person.
ICT	QAR1.46m per year		Smart Energy GB assume ICT support costs to be £334,294 in 2022. ^[116] This includes IT support costs, infrastructure costs, licenses, and network costs. ^[116] Assumed these costs would be the same in Qatar context.
ENVIRONMENTAL DEVELOPMENT			
REDUCED GHG EMISSIONS FROM REDUCED TRANSPORTATION		Not assessed	Reduced greenhouse gas emissions from reduced imports and transportation of food
REDUCED FOOD WASTE	Reduced waste to landfill (Not Quantified)		Local food will have a longer shelf life and therefore food waste should be reduced.
REDUCED PACKAGING	Reduced waste to landfill		Reduced packaging waste as less needed to keep food preserved. Local farmers could implement plastic free produce

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
HUMAN DEVELOPMENT			
BETTER NUTRITION		Not Quantified	Improved taste of food as less preservatives added and allowed to ripen fully. Could lead to an increase in consumption of healthier food choice options.
LOWER COSTS FOR THE HEALTHCARE SYSTEM AS A RESULT OF A DECREASE IN DIET-RELATED MEDICAL CONDITIONS		Not Quantified	
SOCIAL DEVELOPMENT			
JOB CREATION		5 people	The national campaign run in the UK targeted the UK population of 67 million people. Qatar has a much smaller population of circa 2.9million people (November 2022). ^[125] Therefore, it is assumed that many fewer staff will be required. This impact assessment therefore assumes that 5 staff members will be necessary to run this campaign on pride in nationally grown food.

OTHER INTERVENTIONS

Stocktake on progress since 2018 and what the next steps are for the Food Security Strategy 2018-2023 was identified in the first report however, this is not a distinct intervention but an evaluation on what has been achieved so far and the best route for moving forward. This overlaps with the policies set out above, however, it was decided that this was more a check on how best to move forward rather than a stand-alone intervention.

A NATIONAL 'INNOVATIVE AGRICULTURE AND FOOD' FUND

A national 'innovative agriculture and food' fund was explored and proved a popular policy intervention in the survey. This has not however, been impact assessed as it requires further research and discussion with industry.

Funding and incentivisation for the development and roll-out of innovative technologies to enhance circular economy practices within the food and domestic waste sector. Signalling a move to the region becoming a leader in developing sustainable food production systems for hot, arid environments. The aim of this intervention is to establish a fund for the food

and agriculture sector. It could provide funding for research and technology however, most specifically for the implementation of established technologies that have proved to work well in arid climates.

Qatar already has an established National Research Fund through the science and technology park and an agricultural research station at Qatar University therefore opportunities for assistance with technology advancement already exist.^[126] ^[127] However, to assist the farming community further a fund specifically for food and agriculture could be implemented. This could specialise in assisting farmers with the actual implementation of approved technologies on local farms. According to one of the interviewees, assistance is needed to implement any new technologies as the costs and the risks to farmers to implement themselves are high. If incentives and assistance from a fund were available, an increase could be seen in local food production which would lead to further advancements in the technologies as they are tested in the field and assist with national food security.

THE BUILT ENVIRONMENT

Energy Performance Certificates

POLICY DESCRIPTION

To increase awareness and uptake of energy efficiency measures in all buildings in Qatar, the introduction of mandatory Energy Performance Certificates (EPCs) has been proposed. EPCs have been introduced in Europe and provide data on the energy usage and efficiency of properties, rating them between A and G, with A being the most efficient. The regulation requires EPCs and recommendations for improvement in energy performance of a building to be produced when building are constructed, sold or rented out. In the UK, EPCs need to be updated every 10 years.[128]

POLICY OBJECTIVES AND INTENDED EFFECTS

This policy would target all existing and new buildings in Qatar through the Government making EPCs mandatory. The policy aims to boost the uptake of energy efficiency measures by providing directly relevant information about properties to householders, as well as providing the government and academics with data to inform policymaking, interventions, and enforcement. In the UK, making EPCs mandatory enabled an uptake in energy-efficiency measures, with the aim for as many homes as possible to be upgraded to EPC band C by 2035. [129] It also enabled a wide range of organisations to undertake detailed monitoring and analysis of energy efficiency, and educated consumers on the energy efficiency ratings of a range of properties.[128]

POLICY ANALYSIS

The net economic benefit of implementing EPCs in Qatar is estimated to be circa QAR10m per year over a 10 year period. The initial phase of EPC implementation in Qatar is estimated to cost around QAR 14m per year. While the initial setup costs could be high, this is mainly due to the requirement to develop EPCs for all of Qatar's existing domestic buildings. As these are only required to be updated once every 10 years, after initial setup costs, the costs would be significantly reduced. Upfront costs are offset

by energy savings over time. This policy could bring about a reduction of 0.059MtCO₂ per year as well as 330 GWh per year in energy savings, increased transparency and the ability to inform long-term research and future policymaking.

The savings in this impact assessment are just based on the savings from residents being made more aware of their energy use leading to behaviour change and not the potential savings from a ratchet approach. In Europe, EPCs are also used to drive change over time. EPC ratings of E or above are needed for any properties that are privately rented. This will then increase to a C from 2025. [130] This ensures that landlords continuously upgrade their properties to be more energy efficient.

If EPCs are to be made mandatory it is recommended that this policy is part of a package of measures to such as charging residents for domestic electricity usage, grants for renewable technologies and decarbonisation of the grid. This should all be coupled with an awareness campaign to ensure that residents understand the changes, why they are important and the benefits they can bring.

The following impact assessment on making EPC mandatory for domestic buildings in Qatar has been informed by the UK's 2009 EPC impact assessment.[128] This impact assessment calculates the benefits based on increased transparency and does not take into account the increased savings from tightening requirements for EPC ratings over time. These benefits have not been quantified but are likely to lead to substantial emissions savings.

IMPACT ASSESSMENT

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
ENVIRONMENTAL DEVELOPMENT			
CO ₂ EMISSIONS SAVINGS		59 ktCO ₂ e per year	Assuming that the UK's original impact assessment calculation (that 20% of buildings adopt the recommendations for improved energy management and achieve a reduction of 5% in energy use ^[128]) can be applied evenly to the whole cross section of Qatari buildings. ^[36] Energy consumption in the domestic sector in Qatar in 2020 was 32,624,482 MWh. ^[131] The Department for Environment, Food and Rural Affairs (Defra) emissions conversion factors calculate that 1 MWh of Natural Gas = 180 kgCO ₂ e ^[98] . Total CO ₂ emissions savings 32,624,482 MWh x 0.2 x 0.05 x 180 kgCO ₂ e/MWh = 58,723,067 kgCO ₂ e ≈ 59 ktCO ₂ e. It is notable that many of the carbon savings brought about in the UK were incentivised without intervention as households targeted reductions in energy bills ^[128] . However, in Qatar, as utility bills are free for Qatari residents it is likely that fewer savings will be made as there is no direct personal financial incentive to drive increased energy efficiency, though this saving will still be seen to the economy.
ENERGY SAVINGS FROM BEHAVIOURAL ADVICE		330 GWh per year	The UK impact assessment assumed that 20% of buildings would adopt the recommendations for improved energy management and achieve a reduction of 5% in energy use. ^[128] Energy consumption for all non-industrial buildings in Qatar in 2020 was 32,624,482 MWh. ^[131] Assuming all buildings use the same amount of energy 20% of houses used 6,524,896 MWh.

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
ECONOMIC DEVELOPMENT			
COSTS OF SITE SURVEY FOR ALL EXISTING BUILDINGS AND DATA ENTRY TO PRODUCE EPC DATA (EACH EPC LASTS 10 YEARS)	QAR 267m one-off cost		<p>The UK impact assessment estimates that the average cost per privately owned dwelling for an EPC and recommendations report ranges from £35-£120 depending on the size of the property. Given the range of properties in Qatar, we assume £97 per building.^[132]</p> <p>Number of housing units was 404,000 and number of buildings were 223,000 in Qatar in 2020.^[133]</p> <p>= £60,819,000 = QAR 267m to get EPCs for all Qatar's current buildings.</p> <p>Larger and/or more unusual properties will take longer to survey, and more remote properties will incur higher travel costs, with smaller properties in cities involving shorter survey times.^[128]</p>
ANNUAL SITE SURVEY COSTS (NEW BUILDINGS)	QAR 3.4 million each year		<p>Qatar issued 3,969 building completion certificates in 2021.^[134] It should be noted that these certificates could represent multiple buildings and whole complexes in some cases. If we assume that this means 2 buildings for every completion certificate, and the rate of building completion remains constant, that is 7,938 new buildings each year. In reality the number of buildings per completion certificate could be much higher.</p>
COMMUNICATION CAMPAIGN	QAR 1.2m [per 627,000 units]		<p>In the UK impact assessment, it was estimated that the cost of running a communication campaign would be £10m.^[128] This communication campaign was targeted at all UK dwellings.^[128]</p> <p>In the UK in 2009 when the impact assessment was carried out, the UK had 22m dwellings^[115] The cost per dwelling was therefore £0.45.</p> <p>Number of housing units was 404,000 and number of buildings were 223,000 in Qatar in 2020.^[133]</p>

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
			=£282,150 ≈ QAR 1,237,290 to roll the campaign out to all buildings in Qatar. However, given that fixed costs will be embedded in the original price of the UK campaign (e.g. branding costs and website design) the cost of running the campaign in Qatar is likely to be higher than this estimated price. Additionally, due to the transient nature of the population in Qatar the campaign would need to continue to build awareness with the population.
ENFORCEMENT	QAR 22m per year		<p>In the UK enforcement was calculated to cost £17.5m per year.^[128] Enforcement costs were across all UK dwellings.^[128] In the UK in 2009, when the impact assessment was carried out, the UK had 22m dwellings.^[115]</p> <p>The cost in the UK was £0.8 per dwelling. Qatar has 627,000 buildings ≈ QAR 22m per year.</p>
SOCIAL COST OF CARBON		Savings of QAR 63m per year	Social cost of carbon is 1065 QAR/t. ^[12]
HUMAN DEVELOPMENT			
EDUCATION		Not quantified	Tenants have more information about the expected energy costs of the property they are about to occupy and will be able to make informed choices that suits their budget. Landlords have information on how to improve their property cost-effectively. ^[128]
RENTAL PREMIUM		Not quantified	When EPCs become established, it is likely that buildings with better ratings will attract higher rents and hence the property value will increase. This will result in pressure on landlords to improve energy efficiency to maintain the value of their property investment. ^[128]
ENERGY EFFICIENCY INVESTMENT INCENTIVES		Not quantified	As tenants and landlords have more information about the energy efficiency of their homes, this provides a greater incentive for households to invest in energy-efficient measures. ^[128]
SOCIAL DEVELOPMENT			
BETTER QUALITY HOUSING		Not quantified	Enhanced energy efficiency in buildings provides better quality home environments.

SCALE-UP OF RECYCLED AGGREGATE FROM STRUCTURAL AND NON-STRUCTURAL APPLICATIONS

POLICY DESCRIPTION

The construction boom witnessed in Qatar over the past two decades is associated with increased consumption of materials and intensive use of energy. Qatar imports high volumes of virgin aggregate which has associated high costs, and a high carbon footprint from its production and transport. This policy aims to increase Qatar's aggregate recycling capacity so that construction waste, which normally enters landfills, is reused to form recycled aggregate.

POLICY OBJECTIVES AND INTENDED EFFECTS

This policy is intended to better conserve primary materials and reduce accumulated construction waste in landfill sites, with cost savings and lower energy consumption. It could also create a new recycled aggregate market in Qatar that can provide employment opportunities for the population whilst improving resource security for construction materials. A study has already been conducted by Qatar's Ministry of Environment and Climate Change on the implementation of recycled aggregate in construction to illustrate how increasing the use of recycled aggregate can reduce the construction sector's carbon and water footprint, minimise costs and reduce Qatar's reliance on imports.^[135] This policy would put the findings into practice.

POLICY ANALYSIS

This policy would require Qatar to mandate the increase of the proportion of recycled aggregate used in construction to a minimum threshold of 20% (as set out in the QNV 2), and require a rather large upfront investment in the development of aggregate recycling facilities. The use of recycled aggregate is estimated to have net economic benefits of QAR 58m over 10 years (QAR 6m per year) this includes the social benefits of carbon reductions and costs

of around QAR 590m for scaling up Qatar's aggregate recycling facilities. Each year this scheme could save 0.009MktCO₂ and 40,000m³ of water. Much of these emissions and water savings would be realised abroad, where virgin aggregate is produced.

The assessment below assumes that construction companies are legally required to replace 20% of the virgin aggregate they use with recycled. However, there is potential to increase this percentage, particularly in construction of road sub-bases where up to 50% recycled aggregate can be used.^[136]

This policy offers the opportunity for Qatar to become a leader in aggregate recycling in the MENA region through the development of a new domestic recycled aggregate market, advancing Qatar's target to increase the proportion of recycled materials in construction projects by 20% by 2022.^[3] The initiative would also support the expansion of Qatar's economy, create new jobs and increase resource security.

The policy assessment below is based on a study conducted by Qatar's MoECC into increasing of recycled aggregate in Qatar's construction sector, and does not include an analysis of the costs to segregate construction waste.^[135]

IMPACT ASSESSMENT

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
ENVIRONMENTAL DEVELOPMENT			
REDUCED WATER CONSUMPTION		Saves 40,000m ³ per year	<p>Imported virgin aggregate uses 15.5 l of water/tonne.^[135]</p> <p>Qatar imported 3,947,738,422 tonnes of virgin aggregate in Q1 2022. Assuming the same volume is imported across all four quarters that would be imports of 15.8Mt of virgin aggregate in 2022.^[137]</p> <p>= 232,500m³ of water for imported aggregate.</p> <p>Recycled aggregate uses 2.8l per tonne to produce.^[135]</p> <p>= 42,000m³ of water for recycled aggregate.</p> <p>= approximate savings of 200,000m³ of water per year if Qatar replaced 100% of its virgin aggregate with recycled aggregate (these savings are calculated across the entire lifecycle of the virgin aggregate).</p> <p>Qatar's NDS aims to increase the proportion of recycled materials in construction projects by 20%.^[3] Therefore, assuming approximately 20% of virgin aggregate imports are replaced with recycled aggregate.</p>
REDUCED CO ₂ EMISSIONS		Saves 0.009MktCO ₂ per year	<p>Emissions from producing recycled aggregate = 1.33kgCO₂e/tonne.^[135]</p> <p>Emission from producing virgin aggregate = 4.32 kgCO₂e/tonne.^[135]</p> <p>Qatar imported 15.8Mt of virgin aggregate in 2022^[137]</p> <p>= 68 ktCO₂e emitted from production of imported virgin aggregate in 2022.</p> <p>Emissions from using recycled aggregate to replace virgin aggregate.</p> <p>= 21ktCO₂.</p>

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
			<p>= 47ktCO2 saved per year if Qatar replaces 100% of its virgin aggregate imports with recycled aggregate (this includes CO2 savings from across the entire supply chain). Qatar's National Development Strategy aims to increase the proportion of recycled materials in construction projects by 20%.^[3] Therefore, assuming 20% of Qatar's virgin aggregate imports are replaced with recycled aggregate.</p> <p>Carbon savings could be higher should a greater percentage of Qatar's virgin aggregate imports be replaced with recycled aggregate. A full life cycle analysis would be needed to determine emissions savings more accurately.</p>
MEETING DOMESTIC CLIMATE TARGETS		Not Quantified	This aligns with Qatar's NDS and builds on Qatar's target to increase the proportion of recycled materials in construction projects by 20% by 2022. ^[3] However, there is potential to go beyond this target.

ECONOMIC DEVELOPMENT

RECYCLING AGGREGATE	Saves QAR 55m per year	<p>Market price of virgin aggregate = QAR 77/t.^[135]</p> <p>Market price of recycled aggregate = QAR 20-50/t depending on which type of aggregate.^[135]</p> <p>It is assumed that the market price of recycled aggregate is sufficient to cover the cost of producing the aggregate as well as a margin of profit.</p> <p>Qatar imports 15.8Mt virgin aggregate in 2022^[137]</p> <p>Amount spent on virgin aggregate each year = QAR 828,435,840 in 2022.^[137]</p> <p>If 100% of this was swapped to recycled aggregate = QAR 552m.</p> <p>= QAR 276m saved from switching.</p> <p>Qatar's NDS aims to increase the proportion of recycled materials in construction projects by 20%.^[3]</p>
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IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
COST OF SCALING UP AGGREGATE RECYCLING FACILITIES	QAR590m one-off cost		<p>In the UK, it costs £5m to open an aggregate recycling centre which will recycle 120,000t of construction and demolition waste each year.^[138] It has been assumed that the costs would be similar in Qatar.</p> <p>Qatar's NDS aims to increase the proportion of recycled materials in construction projects by 20%.^[3] Each year, Qatar produces nearly 8Mt of construction waste, of which 927,800t are treated.^[34] Assuming 20% of Qatar's aggregate imports are replaced by recycled aggregate, Qatar would need to produce 3.2 Mt of recycled aggregate.</p> <p>Divide the amount of construction waste to be converted into recycled aggregate (3.2Mt) by the amount of aggregate one facility can produce (120,000t assuming same as the UK) = 27 facilities needed in Qatar. 27 x cost of a facility (£5m) = £135m. = QAR590m.</p> <p>If Qatar opened more facilities to process all of the construction waste, it could also export recycled aggregate to neighbouring countries.</p>
SOCIAL COST OF CARBON		QAR 9.6m per year	Social cost of carbon is 1065 QAR per tonne of emissions saved. ^[12]

HUMAN DEVELOPMENT

COST OF RETRAINING	Not quantified		There will be costs associated with the retraining of the labour force in order to run recycled aggregate facilities. In addition, retraining will be required for employees working in construction in order to understand how recycled aggregate functions differently to virgin aggregate.
LABOUR	Not quantified		Although not quantified there is significant potential to increase jobs through expanding aggregate processing in Qatar as well as expanding the economy.

SOCIAL DEVELOPMENT

RESOURCE SECURITY		Not quantified	Increasing the proportion of recycled aggregate reduces Qatar's reliance on imports.
DIVERSIFICATION OF THE LABOUR FORCE		Not quantified	Developing Qatar's domestic recycled aggregate market allows for diversification of the labour market as construction workers can be retrained in a new upcoming industry.

CONSUMER ENGAGEMENT CAMPAIGN

POLICY DESCRIPTION

This policy aims to deliver a targeted consumer engagement campaign to encourage Qatari residents to make more sustainable choices in their homes, such as turning off their lights and air conditioning when they are out. The campaign would include the introduction of market-wide-levers including a digital media campaign, advocacy among politicians and businesses, thought leadership work and the generation of policy evidence and research.

This policy could be paired with other interventions such as the introduction of Energy Performance Certificates (EPCs) to increase its impact.

POLICY OBJECTIVES AND INTENDED EFFECTS

The implementation of this policy will involve the government paying for the role out of a targeted digital campaign which aims to address the sustainability of residents' behaviour in their homes, such as turning off their air conditioning. The campaign will involve the development of a targeted media campaign for defined groups through multiple channels including TV and social media. This policy aims to shift Qatari residents' behaviour in their homes to be more sustainable. This assessment focuses on the costs and benefits of conducting a consumer engagement campaign for residents to turn off their air-conditioning when they are out of the house for 8 hours a day – a practice that is not common, most likely because utility bills are currently free for Qatari residents and very cheap for expatriates.^[139] Reducing air conditioning usage could result in decreased energy usage, thereby reducing CO2 emissions. The scope of the campaign could be expanded to include other behaviours such as turning off lights which would increase energy savings and associated emissions savings.

POLICY ANALYSIS

Whilst this policy could have a net cost of QAR 5m per year over a 10-year period. It could also annually deliver 1,405 MWh in energy savings and 0.0003Mt CO2e savings as a result of residents turning off their air-conditioning whilst they are out of their homes. The scope of this campaign

could be expanded to include additional behaviour changes such as turning off lights to increase the environmental benefits. The percentage of the population who change their behaviours could be much higher as it is based on the smart metering campaign which needed people to undergo home renovations.

Consumer engagement campaigns to encourage sustainable behaviour change have seen success in examples such as the UK, however much of this success was driven by the incentive for residents to reduce their utilities bills. As residents are not currently charged for utilities bills in Qatar, it is unlikely that the same levels of success will be attained, unless this policy is supported by measures such as charging residents for electricity usage.

In Qatar, electricity and water have different tariffs. Residential electricity supplies cost 8 dirhams/kWh up to 2,000kwh. Domestic water supplies are QAR4.4/cubic meters up to 20 cubic meters. Because of these rates, utilities from Kahramaa are much cheaper than in many other countries. On average, you can expect to pay between QAR200 and QAR500 per month for your utilities. In the UK the average cost of a monthly electricity and water bill in 2019 was £107.^[140]

The assessment below is based on the data collected from Smart Energy GB's consumer engagement budget for 2022, which details the anticipated budget required for running a consumer engagement campaign to increase the uptake of metering in UK homes[116] In 2014, Smart Energy GB launched a public-facing campaign to communicate the benefits of smart meters.^[116] Smart Energy GB created standardised communications material, messaging, and branding, which focused on increasing the willingness of consumers to accept installation[29] Smart Energy GB's 2022 budget for running this campaign has been adapted to estimate the costs of running a similar campaign in Qatar.

IMPACT ASSESSMENT

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
ENVIRONMENTAL DEVELOPMENT			
ENERGY USAGE SAVINGS		1,405 MWh per year	<p>In the UK only 1% of people were estimated to have made changes to their consumption of energy as a result of the Smart Energy GB media campaign. This low number is partially the result of the potentially costly nature of the overall changes, which may require modifications to a building's overall insulation. The uptake of changes could therefore be higher in Qatar.</p> <p>If we assume 1% of households will make changes in response to a targeted media campaign.^[47] There are estimated to be 404,000 housing units in Qatar in 2020 = 4,040.</p> <p>According to a study conducted in 2022 by a team of architectural and building engineers, an average household air conditioning unit uses 1,043kWh per year when running all day.^[141]</p> <p>If the air conditioning is off for 8 hours a day, an average house saves 347kWh per year.^[141]</p> <p>= 1,405 MWh savings if 1% of households turn their aircon off for 8 hours a day while they are out. This could increase should a higher percentage of households respond to the consumer awareness campaign.</p>
CARBON EMISSIONS SAVINGS		0.0003MtCO2e per year	<p>According to the above calculation, if 1% of households turn their air conditioning off for 8 hours a day in response to a media campaign, this will save 1,405 MWh per year.</p> <p>According to Defra's GHG conversion factors, the average CO2 generated by burning natural gas is 0.18kg/kWh.[98]</p> <p>Therefore, a consumer awareness campaign will result in the saving of 260tCO2e per year if 1% of households turn their aircon off for 8 hours a day while they are out. This could increase should a higher % of households respond to the consumer awareness campaign.</p>

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
ECONOMIC DEVELOPMENT			
MARKETING	QAR 1.8m per year		<p>Smart Energy GB estimates that the costs of marketing (including creative development, digital production, website development, social media and marketing partnerships) for 2022 to be £26m.^[116]</p> <p>This campaign is targeted at all domestic houses, and the number of UK domestic housing estimated to be 25m.^[115] We assume the same costs for the campaign per household in Qatar (£1 per dwelling). Qatar is estimated to have 404,000 dwellings. This means the campaign could cost QAR 1,773,560 per year. However, there are likely to be efficiencies due to the scale of the UK campaign and so the cost may be higher in Qatar.</p>
COMMUNICATIONS	QAR 0.14m per year		<p>Smart Energy GB estimates that the costs of communications (including public affairs, policy and PR) for 2022 to be £2m.^[116] This campaign is targeted at all domestic houses, which means £0.08 per dwelling. Qatar is estimated to have 404,000 dwellings = QAR 141,400 per year. However, there are likely to be efficiencies due to the scale of the UK campaign and so the cost may be higher in Qatar.</p>
ICT	QAR 1.5m per year		<p>Smart Energy GB assume ICT support costs to be £334,294 in 2022.^[116] This includes IT support costs, infrastructure costs, licenses and network costs.^[116] Assumed these costs would be the same in Qatar context.</p>
STAFF COSTS	QAR 1.6m per year (for 5 staff members)		<p>This UK campaign had 69 staff members.^[116] The national campaign run in the UK by Smart Energy UK targeted UK households, of which in 2021 there were an estimated to be 25m households.^[115] However, Qatar has a much smaller number of households, estimated at 404,000.^[41] Therefore, it is assumed that fewer staff will be required. Scaling by households that would require around 1 person.</p>

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
			<p>However, given economies of scale and the fact that it is more efficient to run a campaign at a large scale, it is assumed that more staff will be needed. This impact assessment therefore assumes the cost of 5 staff members. The estimated Qatar salary of an employee working in design and creative services is QAR27,000 a month.^[117]</p>
SOCIAL COST OF CARBON	Savings of QAR 277,000 per year		<p>Social cost of carbon is 1065 QAR/t. For the above calculated CO2e savings of 260tCO2e per year.^[12]</p>
HUMAN DEVELOPMENT			
STAFF	Additional 5 staff members		<p>This UK campaign assumed 69 staff members. The national campaign run in the UK by Smart Energy UK targeted UK households, of which in 2021 there were an estimated to be 25m households.^[115] However, Qatar has a much smaller number of households, estimated at 404,000. Therefore, it is assumed that fewer staff will be required, around 1 person. However, given economies of scale and the fact that it is more efficient to run a campaign at a large scale, it is assumed that more staff will be needed. This impact assessment therefore assumes the cost of 5 staff members.</p>
TRAINING AND DEVELOPMENT	QAR 0.055m one-off cost		<p>Smart Energy GB estimate training and development costs to be £168,600 in 2022.^[116] This includes full training and development costs for all staff including one-on-one-training, group training and internal planning meetings.^[116] UK impact assessment estimates 69 staff.^[116] In Qatar only 5 staff will be needed (see above calculations).</p> <p>UK cost of training = £2443 per person. Assuming similar training and development costs in Qatar compared to the UK = QAR 54,814.</p>
HUMAN DEVELOPMENT			
GREATER SOCIAL AWARENESS OF SUSTAINABILITY		Not quantified	<p>This creates awareness about environmental footprint and drives more sustainable behaviour change.</p>

LEADERSHIP IN ENERGY AND ENVIRONMENTAL DESIGN

POLICY DESCRIPTION

This policy aims to ensure that all newly constructed buildings in Qatar meet the Leadership in Energy and Environmental Design (LEED) building standards.[142] LEED is a widely used green building rating system available for all building types. [142] It provides a framework for delivering healthy, efficient and cost-saving green buildings. Qatar has already made significant progress in meeting LEED building standards, with the highest percentage of buildings holding platinum LEED registered independently in the world.[3]

POLICY OBJECTIVES AND INTENDED EFFECTS

This policy aims would mandate that all new buildings in Qatar meet internationally recognised green building standards. This means that the planning, design, construction, demolition and operations of buildings are carried out to minimise the impact on energy and water usage in addition to taking into consideration material selection, location and the surrounding community.

POLICY ANALYSIS

The costs and benefits of this policy are difficult to quantify. Ensuring that all new builds are LEED compliant is estimated to cost QAR 1.9bn more per year in comparison to building conventional buildings. Annually it could save 749,661 MWh of energy, 6.8 million m3 of water and 0.15 MtCO2e in carbon emissions savings. The key costs associated with the implementation of this policy arise from increased construction costs. However, these costs are recovered through reduced lifetime costs of the building due to reduced maintenance, energy use and water use, which combined could lead to a total net benefit of QAR 3.7bn in savings each year There are also benefits from rental premiums. Implementing this policy would lead to significant annual energy, water and carbon emissions savings in addition to providing health benefits from improved ventilation.

As no data is available for assessing the costs and benefits of GSAS certification, the assessment below is based on data constructing LEED compliant buildings. The data used in this impact assessment is based on a study conducted by California's Sustainable Buildings Taskforce which conducts an analysis of the costs and savings of building LEED compliant buildings. The findings of the study have been adapted to the Qatari context in order to estimate the potential savings of implementing mandatory LEED certification for all new buildings in Qatar.

IMPACT ASSESSMENT

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
ENVIRONMENTAL DEVELOPMENT			
EMISSIONS SAVINGS		0.13 15 MtCO2e per year	<p>Most electricity in Qatar comes from natural gas. DEFRA emission conversion factor = 0.18kgCO2e per kWh.[98]</p> <p>= 1.5 MtCO2e over 10 years.</p> <p>On average, this would lead to emissions savings of 0.15MtCO2e per year (including emissions from water savings).</p>
WATER SAVINGS		Average savings of 6.8 million m3 per year over 10-year period	<p>291 million m3 of water was used by Qatar buildings in 2019.[68] There are 627,000 buildings in Qatar in 2020.</p> <p>= 464 m3 per year per building. Qatar issued 3,969 building completion certificates in 2022. [134] Assuming that could be 7,938 new buildings that means 3.7 million m3 increased demand from new buildings in year one.</p> <p>Green building can cut indoor water consumption by 30%. [143]</p> <p>Assuming the same number of buildings are built per year as in 2022, water demand over the next 10 years should rise by 202 million m3. if every new building meets LEED certification standards, demand would be 134 million m3. 68 million m3 would be saved over 10 years.</p>
ENERGY SAVINGS		Average energy savings 749,661 MWh per year over a 10-year period	<p>Energy consumption in the residential and commercial sector in Qatar in 2020 was 32,624,482 MWh.[131]</p> <p>Number of housing units was 404,000 and number of commercial buildings were 223,000 in Qatar in 2020. [133] However, it is unclear what percentage of energy is consumed in the residential sector as the Qatar Planning and Statistics Authority does not differentiate between residential and commercial energy consumption.</p> <p>If we average the energy use by building (recognising that some will be high-rises and others will be small houses) that is an average energy use of 52MWh of energy use per building per year.</p>

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
			<p>Qatar issued 3,969 building completion certificates in 2021.^[134] It should be noted that these certificates could represent multiple buildings and whole complexes in some cases. If we assume that this means 2 buildings for every completion certificate, and the rate of building completion remains constant, that is 7,938 new buildings each year. In reality the number of buildings per completion certificate could be much higher.</p> <p>This in an additional energy use of 413,035 MWh each year from new buildings.</p> <p>On average, green buildings use 30% less energy than conventional buildings.^[143]</p> <p>136,302 MWh could be saved each year if all new buildings were LEED certified.</p> <p>Over 10 years you would expect 79,380 new buildings and cumulative energy savings would be 7,496,610 MWh.</p>
ENVIRONMENTAL DEVELOPMENT			
INCREASED CONSTRUCTION COSTS	QAR 1.9 billion per year		<p>Average cost of construction of a building in Qatar = \$2,367 per sqm (QAR 8,618).^[144] There is no available data for the average size of house in Qatar. However, in Gulf States such as the UAE, the average size of a home has shrunk from 533 sqm in 2011 to 294 in 2012.^[145]</p> <p>Average households in Qatar are 7 people so they are much larger than in the UK where the average per household is 2.4.^[133] Taking into account the unavailability of precise data on the average size of new builds in Qatar, the size of UAE homes was chosen.</p> <p>10% of building permit applications are for commercial buildings and 90% are residential in 2021. Commercial buildings are estimated to be an average of 11,400 square meters (this is a rough approximation based on one complex).^[146]</p> <p>Assuming 7,938 new buildings each year, of these 794 (9 million square meters) will be commercial and 7,144 (2.1 million square meters) will be residential.</p>

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
			<p>According to research conducted by California's Sustainable Building Task Force, on average, the premium for green building construction is about 2%.^[143]</p> <p>Construction costs without LEED = QAR 95,660 million</p> <p>Construction costs with LEED = QAR 97,573 million</p> <p>Assuming the same number of buildings are built per year as in 2022, if every new building built meets LEED certification standards, this should increase construction costs by QAR 1,913 million each year.</p>
LIFE-CYCLE SAVINGS		QAR 5.4 billion per year	<p>According to research conducted by California's Sustainable Building Task Force, on average, minimal increases in upfront cost of about 2% to support green design would, on average, result in life cycle savings of 20% of total construction costs. Average building lifecycle is assumed to be 20 years.^{[147][144]}</p>
SOCIAL COST OF CARBON		Savings of QAR 138m 160m per year	Social cost of carbon is 1065 QAR per tonne. ^[12]
HUMAN DEVELOPMENT			
REDUCTION IN RESPIRATORY ILLNESSES		Not Quantified	Reduction in respiratory diseases as a result of improved ventilation.
IMPROVED AIR QUALITY		Not Quantified	Increased air quality from improved ventilation.
HIGHER OCCUPANCY RATE		Not Quantified	Studies show increases in occupancy for residential and office buildings from 0%-23%. ^[148]
HIGHER RENTAL RATE		Not Quantified	<p>Studies show rental premiums as a result of building LEED certified homes can increase in the range of 0-17%.^[148]</p> <p>This increased rental premium, while partially as a result of quality building standards and reduced likelihood of maintenance costs, is also dependent on consumer awareness.</p>

GOVERNMENT PROCUREMENT STANDARDS

POLICY DESCRIPTION

The government, as a large property owner, can transform building standards by setting minimum sustainability standards for all its rented and owned buildings. Sustainable government procurement standards set out the actions that the government departments and their agencies will take to reduce their impacts on the environment from 2021 to 2030.

POLICY OBJECTIVES AND INTENDED EFFECTS

Sustainable procurement standards aim to reduce the government's environmental impact and improve its environmental performance over a specific timeframe. Green public procurement standards establish targets for government departments and their agencies to reduce their greenhouse gas emissions, send less waste to landfills, and reduce the overall amount of waste they produce and minimise water consumption. They additionally set out commitments for departments to improve sustainable procurement and report transparently on key sustainability issues. Achievements against these targets are often assessed on five-yearly cycles. Case studies on green public procurement have demonstrated that, by ensuring that governments buy more sustainable and efficient products and engage with their suppliers to understand and reduce the impacts of their supply chain, these schemes can be highly successful.

In order to fulfil this objective, the government included the following targets: ^[149]

- a) Embedding the government buying standards into departmental and centralised procurement contracts
- b) Improving and publishing data on supply chain impacts, initially focussing on carbon, but also water and waste. Detailed baselines were set for reducing these impacts. In their reporting, departments were required to include information on the systems they had put in place and the action taken to buy sustainably,

including:

- compliance with the government buying standards in departmental and centralised procurement contracts; and
- understanding and reducing supply chain impacts and risks

POLICY ANALYSIS

Adopting a regulation for sustainable government procurement standards in Qatar is estimated to have a net economic benefit of QAR 132m per year, in addition to a reduction in air pollution and the creation of new green jobs. This policy could reduce greenhouse gas emissions by 0.05MtCO₂e per year, increase the energy efficiency of buildings, reduce water and waste consumption, and increase transparency, institutional efficiency and sustainable procurement training opportunities.

However, as 73% of buildings affiliated with central government have achieved LEED green building standard, many of the benefits of the policy which relate to the efficiency of the buildings themselves will already have been realised. ^[41]

The assessment below is based on the UK's Greening Government Commitments and the annual progress report, from UK government departments and their agencies. ^[149] The annual report measures the environmental performance of the UK government's own estate and operations, in line with the 25 Year Environment Plan. Departments must also demonstrate each year how they ensure the goods and services bought are as sustainable as possible. They must report transparently on their actions on climate change adaptation, biodiversity, sustainable food and catering, sustainable construction, and any other significant aspects of their work that could negatively impact the environment.

The legislation has been highly successful, and the government was able to reduce emissions by 50% in the 2019-2020 compared to the baseline. ^[149] 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. ^[149]

IMPACT ASSESSMENT

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
ECONOMIC DEVELOPMENT			
COSTS OF IMPLEMENTING ENERGY SAVING MEASURES IN PUBLIC BUILDINGS	Not quantified		<p>The UK government spent £1bn on the implementation of energy efficiency measures and £2.5bn in supporting of public buildings such as schools and hospital in implementing those measures. ^[150]</p> <p>The Qatari government has 24 government buildings.^[3] The cost of implementing measures will vary depending on the modernity of the buildings and the existing measures in place. Retrofits with the highest impact tend to focus on HVAC systems and lighting. ^[63] One approach that the government could take is to scale up the use of district cooling systems across all government buildings. As most government buildings are LEED certified, improvements to the buildings may not be necessary.</p>
DESALINATION COSTS		QAR 20m per year	<p>The UK saved 4,529,226m³ water over a 10-year period, for a 12% reduction in overall water consumption.</p> <p>Qatar Government used 156.65m³ of water in 2019^[41]. However, this is primarily due to water used for public spaces rather than government offices.</p> <p>If Qatar saved the same proportion as in the UK (12%), Qatar would save 19 million m³ of water each ye. ar^[68] 51% of Qatar government's water is from Kahramaa, with 49% from Treated Sewage and Effluence (TSE). ^[68] This means, of the water saved, 6.1 million m³ would have come from desalination.</p> <p>The cost of desalination in Qatar is estimated to be between QAR 2.23/m³ to QAR 3.34/m³ ^[152]. A reduction of 6.1 million m³ would save up to QAR 20m in desalination costs each year. In practice, this saving would be higher as it does not include the savings from reductions in wastewater treatment.</p>

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
SOCIAL COST OF CARBON		QAR 52m per year	Social cost of carbon is 1065 QAR/t. ^[12]
ENVIRONMENTAL DEVELOPMENT			
GHG EMISSIONS REDUCTION		0.4MtCO ₂ e emissions reductions per year	<p>Assuming an average of 117MWh per commercial building each year or 2,809 MWh across all 24 government buildings each year and an energy saving of 1,770 MWh per year.</p> <p>Using the UK's natural gas conversion metrics (0.18kgCO₂e per kWh) this is a saving of 0.0003MtCO₂e per year. ^[98]</p> <p>Desalinated water is very energy intensive. It is estimated that the equivalent consumed electric power per m³ of desalinated water by the MSF desalting system is 20kWh/m³. ^[69] If Qatar saved the same proportion of water as in the UK (12%) Qatar would save 19 million m³ of water each year. ^[68]</p> <p>6.1 million m³ of this is assumed to be desalinated that is 122,000MWh energy saved each year from desalination or 0.021MtCO₂e saved each year.</p> <p>The total waste saved from government buildings is assumed to be 49kt per year. Using the UK conversion metrics for commercial waste disposal (467kg CO₂e per tonne), this is 0.023MtCO₂e per year.</p>
WASTE		49kt per year	<p>Waste in the UK government was reduced by 39%. This was through sustainable construction, including the management of construction waste to best practice standards, the application of BRE's Environmental Assessment Methodology. Further commitments that contributed to this included cutting paper by at least 10% annually and a requirement for "closed loop" recycling, as well as ensuring that redundant ICT (Information and communications technology) equipment was re-used (within government, the public sector or wider society) or responsibly recycled. There were departmental swap-shops for unwanted equipment and stationery. A cross-government pilot project was developed on the reuse of stationery, office supplies and IT equipment which supported the drive to reduce waste. ^[149]</p>

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
			<p>Food provided in catering outlets of the UK government was made local and seasonal, which reduced the energy used in food production, transport, and storage. Food was supplied from farming systems that minimise harm to the environment, such as production certified by LEAF, the Soil Association or Marine Stewardship Council. ^[149]</p> <p>There is no data on government waste production, however the average waste production in Qatar is 1.5kg per person per day. The number of people who work for the Qatari government is 231,265. ^[133]</p> <p>This would mean waste generated was 127kt each year. This figure would be lower, as some of this waste would be generated through domestic activities. Procurement standards could reduce the waste produced by 49kt each year.</p>
WATER SAVINGS		19 million m ³ of water each year	<p>In the UK, to reduce water use, new water saving features were installed as part of the refurbishment. ^[149] These included: dual flush mechanisms and waterless urinals; Passive Infra-Red (PIR) Shut off Valves to the toilet. The existing cold-water supply serving each of the individual toilets and shower rooms was fitted with an occupancy shut down system. A water leak monitoring system was also installed. The cold-water supply systems within the buildings were monitored for leakage and water wastage. In terms of reporting, all government departments have to report on office water use against benchmarks. ^[149]</p> <p>Qatar Government used 156.65Mm³ of water in 2019. ^[68] If saved the same as in the UK (12%) Qatar would save 19 million m³ of water each year.</p>
ENERGY SAVINGS		1,770 MWh per year	<p>The UK government reduced energy consumption by 63%. ^[149]</p> <p>There are 24 government buildings in Qatar.</p> <p>10% of building permit applications are for commercial buildings and 90% are residential in 2021. Commercial buildings are estimated to be an average of 11,400 square meters (this is a rough approximation based on one complex). ^[146]</p>

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
			Assuming 7,938 new buildings each year, of these 794 (9 million square meters) will be commercial and 7,144 (2.1 million square meters) will be residential.
			Number of housing units in 2020 was 404,000 and number of buildings were 223,000 in Qatar. ^[133]
			Energy consumption in the residential and commercial sector in Qatar in 2020 was 32,624,482 MWh. ^[131] Assuming 80% of Qatar's building area is commercial buildings, we can assume 26,099,586MWh per year of electricity is from commercial consumption across 223,000 buildings. This is an average of 117MWh per building each year or 2,809 MWh across all 24 government buildings each year. A 63% reduction would save 1,770 MWh per year.
			However, UK government buildings are very old (some several hundred years old) and so there is significant potential for improving energy efficiency. It is unlikely that Qatar government buildings would achieve a 63% reduction in energy use in the same way, especially if they are LEED certified.
			UK departments have improved their performance by implementing an Energy Management System. In addition, a closer monitoring of energy consuming systems has enabled systems to be turned off when not needed. Estate rationalisation was achieved by moving servers either off-site or within existing buildings which led to a streamlined estate alongside a commensurate reduction in energy use. Old air conditioning units in many offices were replaced with new efficient equipment. Some departments achieved further savings through reduced estates and energy efficiency measures, including the Energy Spend to Save programme that was established as a good practice. The UK government also invested in improvements across the government estate to enhance energy performance, through efficient Heating, Ventilation and Air Conditioning (HVAC) systems, LED lighting, low carbon District Heating Networks and renewable energy generation. All the 14 new Government Hubs have been developed to at least BREEAM (Building Research Establishment Environmental Assessment Method) Excellent standard, aiming to improve on a range of areas including biodiversity, sustainable travel and resilience to climate change. ^[149]

IMPACT DESCRIPTION	VALUE (COSTS)	BENEFITS	ASSUMPTIONS
SOCIAL DEVELOPMENT			
JOB CREATION		90 new green jobs in the government	Assuming that on average there would be 5 staff per department engaged in the implementation of the greening government commitments in Qatar, which means 90 staff across all 18 government departments. These staff would oversee the department's implementation of targets, monitoring and data collection, public communications and coordination between departments on the scheme.
CENTRAL GOVERNMENT ADMINISTRATIVE COSTS	QAR30.2m per year		As calculated above, 90 new green jobs in the government will be created with the introduction of sustainable government standards. With an average gross salary of QAR 28,000 per month for public officials, administration costs for the scheme would be QAR30.2m per year. ^[153]
SUSTAINABLE PROCUREMENT TRAINING OPPORTUNITIES			More government officials receive training on how to apply sustainable procurement standards and adopt smart working processes to achieve the targets.
HUMAN DEVELOPMENT			
REDUCTION IN RESPIRATORY ILLNESSES		Not Quantified	Reduction in respiratory diseases as a result of improved ventilation
IMPROVED AIR QUALITY		Not Quantified	Increased air quality from improved ventilation
HIGHER TRANSPARENCY		Not Quantified	The adopted reporting procedures increase the transparency of government sustainable practices and in particular sustainable procurement standards
INSTITUTIONAL EFFICIENCY		Not Quantified	The adoption of GGCs resulted in an overall higher institutional efficacy in terms of planning, performance and reporting.

CONSTRUCTION PRODUCTS REGULATION (QUALITATIVE ASSESSMENT)

POLICY DESCRIPTION

The policy aims to introduce standards within the construction sector including on the environment and safety by putting regulation at the service of the country's climate ambitions. It takes into the consideration the carbon impact over the entire life cycle of the building, including its construction and demolition phases.

POLICY OBJECTIVES AND INTENDED EFFECTS

The objective would be transform building types and construction methods, with the gradual phase out of gas heating and the promotion of low-carbon construction systems. This approach is based on a French government policy, RE2020 regulation, that aims to improve the environmental performance of buildings over their whole lifecycle.^[154] The approach focuses on the decarbonisation of the most common materials, a more common use of wood and bio-based or geo-based materials and a greater mix of construction materials in general.

The main goals would be:

- Prioritising the energy savings and energy decarbonisation;
- Reducing the carbon impact of building construction; and
- Ensuring house comfort in high heat.

The policy also aims to set a progressive trajectory, with milestones planned for 2025, 2028 and 2031 that would gradually enhance requirements. In addition, the government could collect data on the energy performance of newly constructed buildings as well as on the materials they are constructed with, with the aim of reviewing results regularly. This will make it possible to monitor the deployment and impacts of the regulations and carry out on an objective basis a review over time and possible adjustments on the subjects that will require it.

POLICY ANALYSIS

The qualitative impact assessment is based on a study that assesses potential implications of RE2020 regulation in the Qatar context. The policy would ensure that carbon impact over the entire life cycle of the building was considered, including its construction and demolition phases. Above all, all the new requirements involve an ambitious transformation of building types and construction methods, with the gradual phase out of gas heating in tandem with low-carbon construction systems. The centrepiece of the French policy on maximizing energy savings is called the "energy sobriety plan" and includes the 19°C indoor temperature recommendation, which has been part of the French energy code since 1978. [154] The RE2020 also encourages a technology switch towards the increase of renewable energy for heat (heat pump, biomass, heating networks, etc.) in the buildings. [154] Similarly, Qatar could also mandate maximum temperatures for air conditioning and the use of renewable energy to power them.

As most of the carbon footprint is related to the construction and demolition phases, which represent between 60 and 90% of the total carbon impact calculated over a period of 50 years, the policy focuses on the use of more low-carbon construction methods. This includes the decarbonisation of the common materials, including an increased use of wood, bio-based or geo-based materials and encouraging a more diversified mix of materials in general. Targets could be gradually increased over time.

IMPACT ASSESSMENT

No data is available on the costs or benefits of this intervention and so it has not been possible to undertake a full assessment.

OTHER POLICIES

Additional policies were identified which overlap with policies set out above, but could be stand-alone interventions:

Sustainable buildings strategy: A strategy setting out the government's approach to improving circularity and sustainability from construction to decommissioning of buildings and key performance indicators.

This policy has not been impact assessed as a sustainable buildings strategy provides an overarching framework for making the buildings sector more circular, rather than targeted policy interventions which can be assessed using an impact assessment.

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.

Upon further research, it was discovered that the key barriers to uptake of recycled aggregate were based on technological issues such as the lack of segregation of materials and the lack of suitable reprocessing infrastructure. Therefore, it was overall concluded that the use of tax incentives would not be the most suitable mechanism for incentivising the use of recycled aggregate in the construction sector.

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Earthna is focused on developing tools, solutions, and policies to improve people's lives within a thriving natural environment. Working together with our community to co-create and design solutions that utilize our resources and understand our local culture and needs, we deliver a message of hope and impactful action that will strengthen our legacy.

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