PEOPLE PROJECT PLANET

LEVERAGING ARCHITECTURE

أستاد ASTAD

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ASTAD

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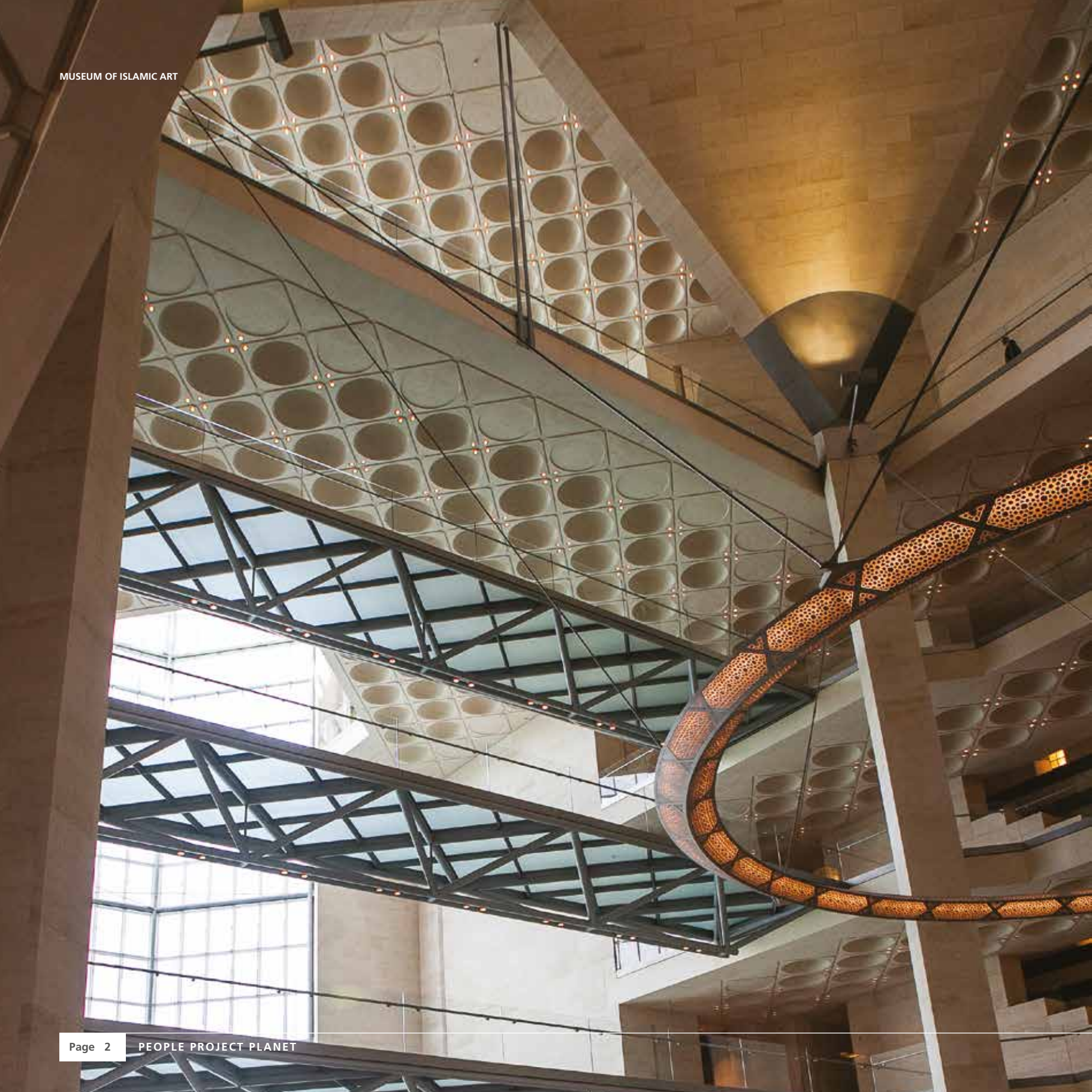

MUSEUM OF ISLAMIC ART

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- Qatar's residents and visitors for their **EXPECTATIONS**
- All forces and agents of Good for their **GENEROSITY** in pursuing sustainable development


QATAR NATIONAL CONVENTION CENTRE

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1. Foreword

ASTAD understands your need to deliver value to your shareholders and constituents amid global constraints, local pressures and business opportunities. In Qatar and elsewhere, there are official calls for institutions and corporations to work with approaches that are consistent with the Triple Bottom Line – executing effectively with a perspective on profit, people and the planet.

The National Development Strategies and Policies of developed and emergent countries all integrate a Triple Bottom Line perspective and we propose this book as a tool for you to leverage the power of architecture to assist you in your noble ambition to contribute responsibly to the acceleration and resilience of the related National Vision.

You face the need to operate efficiently in effective buildings not only housing but also enhancing your operations. The UN IPCC Report SR15 also reminds us of our duty to accelerate synergies and direct our development actions towards more sustainable outcomes.

It's important that your design partners work in alignment with your understanding of the potentials of Building Design Thinking. Working together, you will ensure that you execute cost-effective projects with tangible operational benefits provided by efficient design. It takes as much effort to complete a bad design as it takes for a good design. The experience drawn from our long practice of delivering building and infrastructure projects shows that the critical issue is in the investment/value you allocate – with the strategic thinking members of your organization fully engaged in the early stages of the project inception and briefing – to the qualified design professionals who will collaborate/interface with your team.

We trust you'll find this book is worth a small investment of your time. It contains enlightening images and insights showing the benefits of a far-reaching strategic design brief and of design partnerships addressing critical realities and partnering with you to deliver value for your shareholders, and beyond for our communities, our cultures and for our world.

We are proud to participate here, from the vantage point of architecture, in your Triple Bottom Line discussion by highlighting that any of your building projects can also – with the proper strategic design briefing – be a powerful agent of your Corporate Social Responsibility and support the emergence and resilience of our communities.


SUSTAINABLE DEVELOPMENT GOALS
1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
17 PARTNERSHIPS FOR THE GOALS


PRESENT BOOK
PEOPLE
PROJECT
PLANET
SUSTENANCE
POVERTY MITIGATION
HEALTH & HAPPINESS
GENDER EQUALITY
COMMUNITY EDUCATION
INCLUSION AND POSITIVE PEACE
VIABLE CITIES & COMMUNITIES
SUSTAINABLE ENERGY
ECONOMIC EMPOWERMENT
INNOVATIVE INDUSTRIES & INFRASTRUCTURE
ECONOMIC INCLUSION
PARTNERSHIPS & SYNERGIES
CLEAN WATER
RESPONSIBLE CONSUMPTION
CLIMATE RESILIENCY
WATER RESPECT
LAND BIODIVERSITY

2. Introduction

This book is not about architectural styles.

This book recognizes the power of clients, both institutions and corporations, to critically influence the outcome of the facility or building design and construction process by imposing strategic and tactical design brief requirements which, beyond the project's strictly functional requirements, can unleash long-term sustainable benefits for people and the planet.

A building should not be an end in itself. Corporations and institutions must invest in design processes requiring reflection on their essence and substance beyond the immediate present and looking at their field of operational capabilities versus potential disruptions.

In our 21st century world, The UN Intergovernmental Panel on Climate Change report SR15 addressing the impact of global warming of 1.5 °C **(Ref.2.1)** urges us to act in the next decade to significantly change our current unsustainable operating models. This brings back to the fore the Triple Bottom Line concept identified by John Elkington **(Ref.2.2)**.

Our social and environmental ecosystem is taken for granted, but in the wake of the latest UN IPCC SR15 report, there is a need for the emergence of a public-private alliance to create synergy and support in each construction project.

As per the example of Qatar's population policy **(Ref.2.3)** which demonstrates that our world requires interrelated decisions and cross-pollinating projects to deliver sustainability in the execution of strategies, this book displays the power of leveraging architecture to deliver future-ready solutions for corporations and institutions and meet strategic and tactical goals set by countries, regions, cities and communities.

The United Nations 21st Century Sustainable Development Goals (UN SDGs) are used as a framework for our perspective and inspire the topics chosen for our chapters. With corporations and national institutions contributing to their countries' national strategies, it is interesting to look at the alignment of national development strategies, Qatar's National Development Strategy 2 for example, and the UN SDGs.

Our focus is on building design and architecture amid needs and requirements for sustainability. This book deals with three topics: People – Project – Planet.

The UN SDGs are not specifically divided into sections such as people, project and the planet. Their focus is on interrelation rather than categorization. Because our focus is on building design and architecture, we have selected the topics of people, project and planet, to reflect the positive, substantial contributions architecture and design are making in each of these areas.

The primary audience of this book is clients: individuals or groups of decision-makers who commission facilities. We highlight several topics which can be considered in designs so the results meet client needs and also give back to the community – beyond looks.

This book raises awareness that architecture must be leveraged in every corporate and institutional project to contribute at strategic and tactical levels as an essential component of national strategic transformation and sustainable resilience.

References

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an IPCC special report on the impacts of global warming of 1.5 °C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.
Summary for Policymakers
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Ref.2.1: John Elkington (1994), Triple Bottom Line.
Retrieved from: http://www.johnelkington.com/archive/TBL-elkington-chapter.pdf

Ref.2.3: Permanent Population Committee - PPC (2017), The Population Policy of The State of Qatar 2017 -2022.
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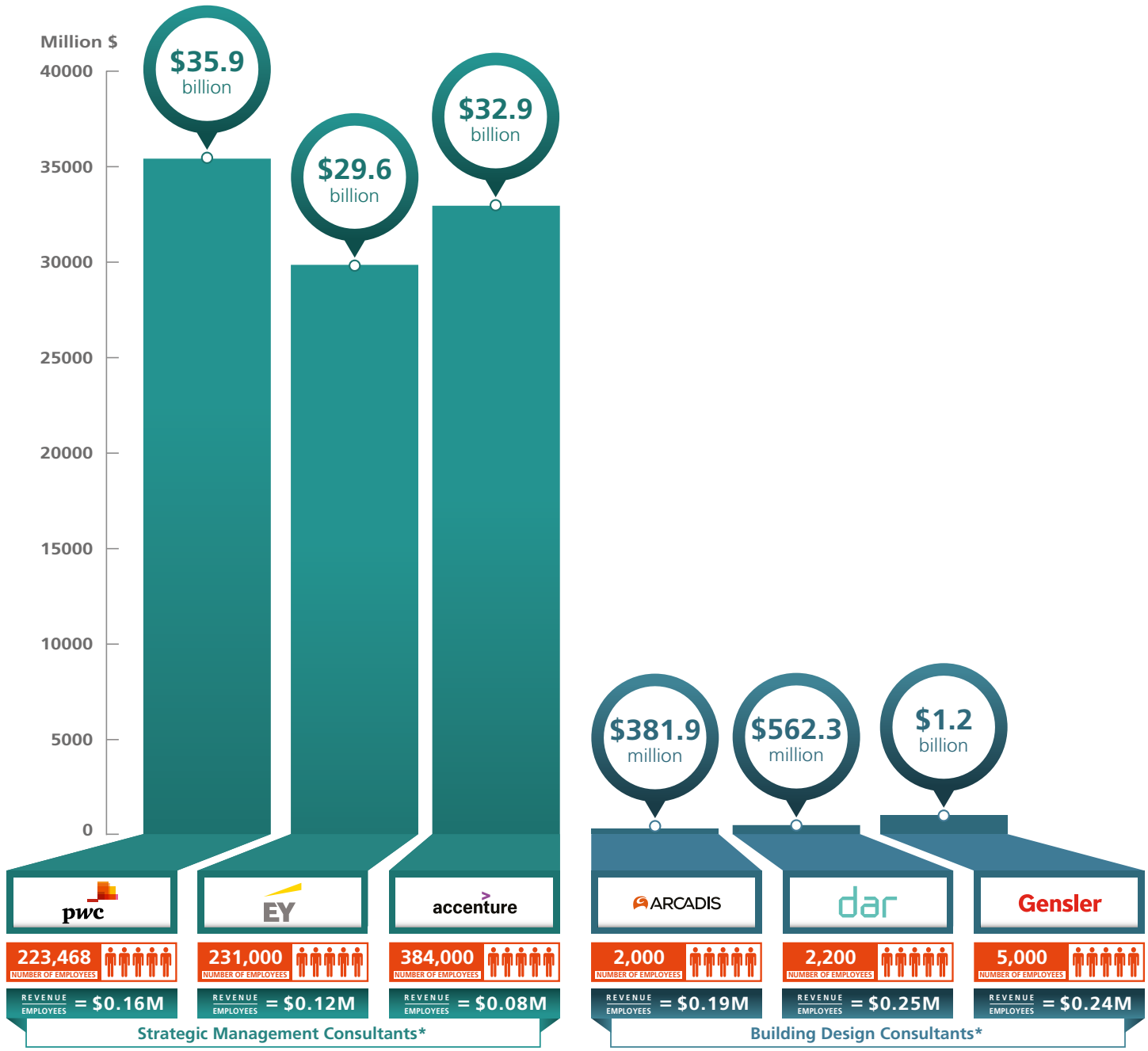
3. Background

2016 Global Revenues

(Total Revenue / Number of Employees)



** The sources for the Strategic Management Consultants information came from their respective annual reports.*

** The sources for the Building Design Consultants information came from their respective websites and the Archinect website.*

3.1 Strategic Design Briefing

> “It is important to note that the building designer’s view of what the client wants is the design. It is not the strategic design brief. The strategic design brief must be a document fully integrated by the client’s team...”

Architecture is a business.

It may be executed by engaged professionals who are passionate about creativity and innovation, but it is a business.

Accordingly, one should consider the prospect of two projects:

- One is based on a project-specific strategic design brief articulating a corporate or institutional vision with a clearly expressed, prioritized Triple Bottom Line approach; aesthetic-neutral components; and commitments to people and the environment at local, regional and international levels.
- Another one only has a single bottom line design brief focused on a schedule of area cross-linking, to a generic corporate social responsibility document.

It is easy to imagine which project is likely to suffer from a cookie-cutter approach, with a lack of collaboration and the temptation to deploy shallow aesthetic gestures that add nothing of consequence. In that scenario, the impact will be the consumption of money without prioritization, or effective Triple Bottom Line results – with adverse effects that stretch across decades.

Corporations and institutions often require the assistance of strategic management consultants to help them define strategies and policies. Considerable time and efforts are then spent by the organizations’ leadership to work with consultants and define the way forward. The graphic figure on the opposite page summarizes the staggering annual revenues accumulated by some of these consulting firms. The Middle East portion is significant when you look closely at the firms’ annual reports.

When comparing the annual revenue of these consulting firms versus the revenue for top-tier building design companies, you can see that corporations and institutions around the world spend far more money on strategic management consulting than they do on design. A second reading of the market structure shows that an extraordinary concentration of strategic management consulting is performed by a small number of firms, while the building design field consists of a vast constellation of firms. This creates a dilution of knowledge in the building-design sector and shows a concentration of knowledge among the strategic management consulting firms, which creates opportunities and risks.

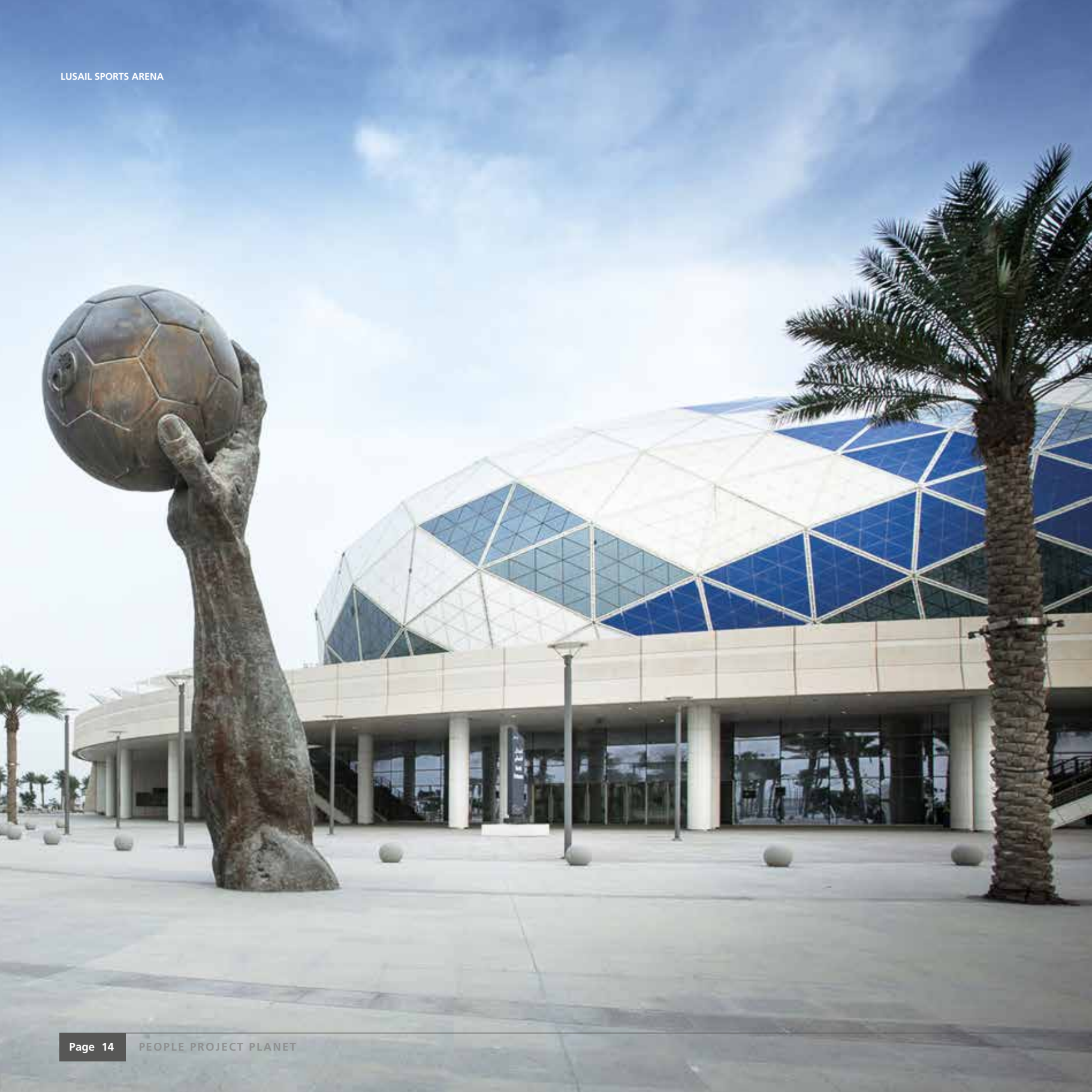
Accordingly, strategic management consulting findings should be leveraged and used systematically to establish strategic design briefs for your projects. Assuming a Triple Bottom Line approach is embedded in the findings for a specific corporation or institution, this should be leveraged to generate relevant questions and explicit requirements in the strategic design brief for a building project at its inception.

This is not happening as often as it should.

Strategic management consultants come back to the same institutions or corporations every 5 to 10 years, but the buildings will be here for 40 to 80 years.

There can be a strange disconnect between the time dimension of a design and construction project and the amount of strategic involvement some clients put in the explicit definition – at the project’s inception stage – of the project’s multi-dimensional requirements.

When comparing revenue per employee among top-tier building design companies and strategic management consulting firms, it is clear that building designers deliver much more revenue per employee of their firms. This means that for building projects, it is essential for clients to extract as much return on investment as possible from the building design consultancy firm. To do so, clients must provide building design firms with a strategic design brief that is based on a Triple Bottom Line framework that is binding with regard to statements



LUSAIL SPORTS ARENA

3.1 Strategic Design Briefing

of requirements.

It is important to note that the building designer's view of what the client wants is the design. It is not the strategic design brief. The strategic design brief must be a document fully integrated by the client's team with a commitment throughout the client's structure to align it with the Triple Bottom Line layers of the strategic management consulting findings. Developing the strategic design brief could require external, specialist advice.

This book provides some inspiration and insights for creating detailed project specific content for strategic design briefs reflecting the need of our 21st century and the ambitions and responsibilities of engaged corporations and institutions.

3.2 VUCA

> The problem is that few organizations are effectively challenging themselves to operate in this higher level of complexity, especially when it comes to planning their buildings, infrastructure and facilities.

In a 1998 report that trained U.S. Army officers for the 21st century, in a post-Cold War environment, the acronym VUCA was coined to acknowledge the Volatility, Uncertainty, Complexity and Ambiguity that operations were facing and would face for the foreseeable future.

The concept of VUCA has been embraced in all sectors of society, in particular – as popularized by Harvard Business Review – in the business and institutional worlds, to describe the nature of their professional environments.

To summarize:

Volatility includes challenges that are unexpected, not stable and may be brief, but not necessarily hard to understand. This relates to the accelerating rate of change.

Uncertainty occurs when our information about the root causes of something that has happened is limited, which creates this lack of predictability. Uncertainty refers to times when relevant information is unavailable and unknown.

Complexity is based on conflicting interests such as shareholders' demands and official requirements. In all facets of construction projects, clients and designers will encounter the interconnectedness of cause-and-effect forces.

Ambiguity presents itself when there is enough information to understand something, but the meaning and impact are unclear, which creates strong potential for mistakes and misunderstanding.

The act of conceptualizing, designing and building a facility with a useful life of 30, 60 or 100 years could be seen to require unrealistic levels of confidence about the future. Although we cannot predict the future, clients and building designers can collaboratively apply strategies that integrate a VUCA mindset in the process and ensure there is flexibility in key elements of the project – before, during and after it is created.

By defining the nature and facets of instability we inevitably face, we can plan for its diverse effects. Negative complexity is governed by the same underlying principles as positive complexity. The problem is that few organizations are effectively challenging themselves to operate in this higher level of complexity, especially when it comes to planning their buildings, infrastructure and facilities.

There can be a tendency to resort to business-as-usual approaches because so many things appear to be volatile, uncertain, complex or ambiguous that there is no point in trying to control outcomes. That approach is unwise, and contradicts Peter Drucker's opinion that, "The best way to predict the future is to create it."

In the wake of raising awareness of VUCA, a Harvard Business School writer **(Ref. 3.2.1)** added the concept of the VUCA manager, someone who works with Vision, Understanding, Courage and Adaptability to anticipate and respond effectively to changes, surprises and problems:

Vision – Steer through the chaos to conceptualize a clear vision for the organization: its mission, values and strategy.

Understanding – Use an in-depth understanding of the organization's capabilities and strategies to rapidly leverage changing circumstances, tapping into multiple information channels covering a wide array of engaged and exposed viewpoints attuned to changes in their markets and sectors.

References

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Cont'd.


SIDRA MEDICINE

AL SHAQAB VVIP PAVILION

3.2 VUCA

Courage – Step up to these challenges and make audacious decisions that embody risks and dare to engage in pioneering future-ready pilot projects or initiatives, based on decisions informed by trend analysis.

Adaptability – Employ flexible tactics that are required for rapid adaptation to changing external circumstances without altering the strategic course.

Investing in reflective inception and collaborative time during strategic design briefs' early design stages and working with your design team to develop VUCA-influenced questions and propositions for your project's strategic design brief will deliver a facility that provides decades of effective, future-ready service to owners and the people who use it.

Clients and designers must ask themselves from their projects' earliest days – and from the perspectives of internal users, visitors and onlookers – how the design at the spatial, physical, technological and digital levels will **(Ref. 3.2.2)**:

- Shape the culture around the organization's mission and values, refine and maintain focus on the mission and values, and encourage leaders at all levels to live by and reinforce the organization's values.
- Democratize information rather than enshrine it; make employees feel empowered to make decisions and facilitate informal communication opportunities.
- Speed up interactions as much as possible, which matters more than pursuing perfection.
- Dare to create the future based on an open-minded approach to identifying trends and their potential positive disruption against traditional benchmarks.
- Create leadership development and facilitate a continuous and progressive system of professional education, training and job experiences to prepare for managing change.

Within these ongoing challenges and realities of life in our nation, region and world, there are increasing calls and requirements for social responsibility. The "Corporate Social Responsibility – Best Practice Guidelines" book from the Abdullah Bin Hamad Al-Attiyah International Foundation for Energy and Sustainable Development **(Ref. 3.2.3)** highlights that, "The rapidly changing times and business environment move us deeper and deeper into the new era of corporate responsibilities, where companies are expected to be good neighbors."

The guidelines identify four characteristics of initiatives relating to corporate social responsibility (CSR):

- CSR initiatives as an integral part of core business.
- CSR initiatives that are well aligned with the governmental developmental agenda.
- CSR initiatives that serve as tools for addressing social needs.
- CSR initiatives that serve as tools for responsible environmental management.

These characteristics can be addressed when a building project is considered to be an active element of the corporation or institution's CSR – if the strategic design brief addresses requirements for all the project life cycle stages. For corporations and institutions to reinforce the capability of their leadership, along with their managerial and operational levels, to own a project's strategic design brief – and exercise Vision, Understanding, Courage and Adaptability in its detailed initial development – the relevant employees should:

- Get effective awareness and training on matters of sustainability and Triple Bottom Line according to the "IEMA" (Institute of Environmental Management Assessment) Sustainability Skills Map or similar. **(Ref. 3.2.4)**.
- Develop awareness and engage with global platforms seeking to develop solutions for today's international challenges such as the Paris Peace Forum **(Ref. 3.2.5)**, which focuses on governance projects and initiatives relating to peace and security, the environment, development, new technologies and inclusive economies.

References

Ref.3.2.2: Sunnie Giles (2018), How VUCA Is Reshaping The Business Environment, And What It Means For Innovation.
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Ref.3.2.4: IEMA (2018), Sustainability Skills Map.
Retrieved from: https://www.iema.net/sustainability-skills-map

Ref.3.2.5: Paris Peace Forum (2018).
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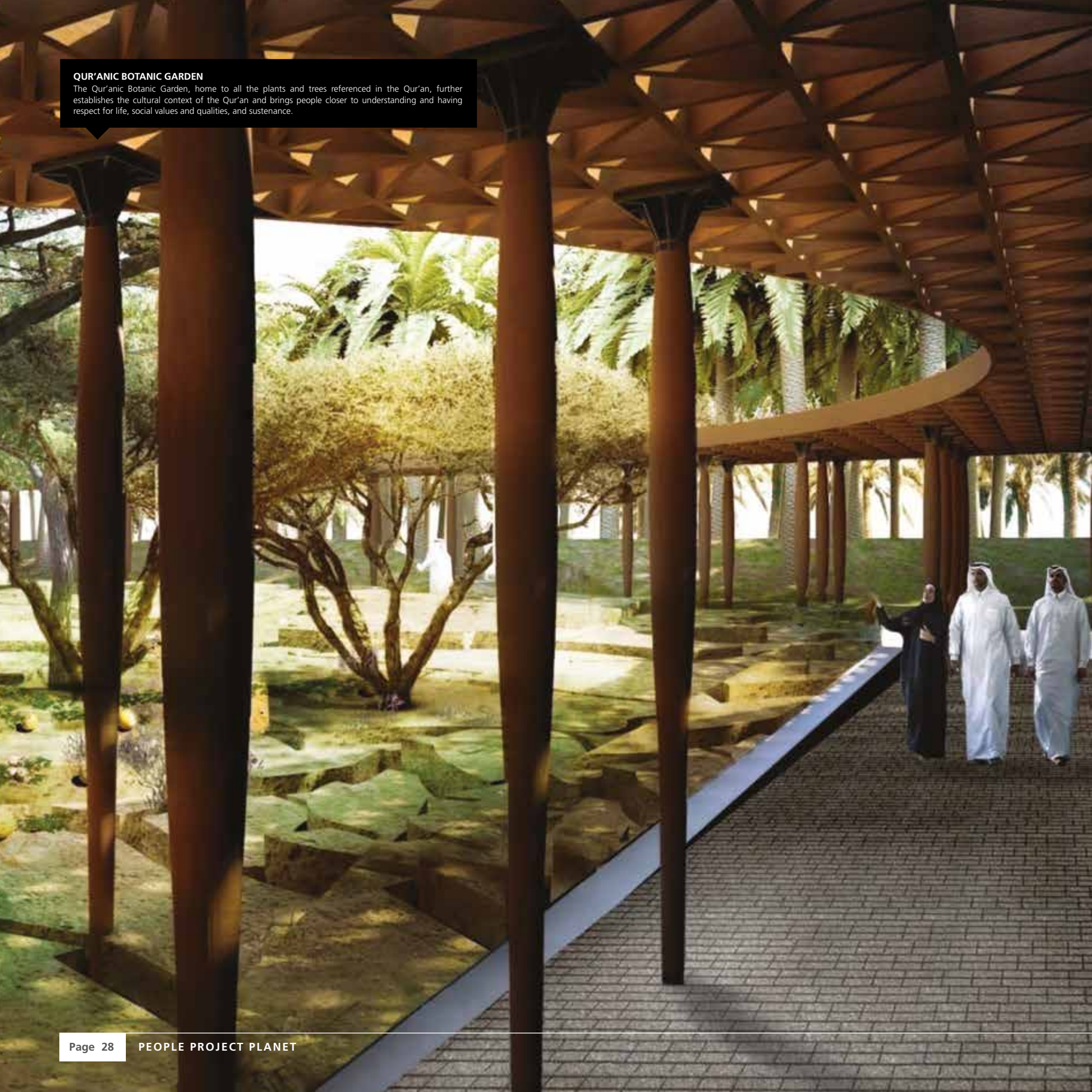
MANATEQ HEADQUARTERS

4. People



QUR'ANIC BOTANIC GARDEN
The Qur'anic Botanic Garden, home to all the plants and trees referenced in the Qur'an, further establishes the cultural context of the Qur'an and brings people closer to understanding and having respect for life, social values and qualities, and sustenance.

4.1 Sustenance

> States can contribute to these developments, but corporations and institutions can also bring their capabilities to these daily efforts.

In describing its goal to end hunger, achieve food security, improve nutrition and promote sustainable agriculture, the UN notes that 790 million people don't have regular access to adequate food. The UN's goal is to double small-scale food producers' agricultural productivity and incomes by 2030 while ensuring food production systems are resilient and sustainable.

The immediate priority is that communities cannot thrive or contribute to society's needs and ambitions if their basic nutritional needs are not addressed. On a broader level, poorly managed food security can unsustainably consume a nation's resources. Addressed effectively, though, it can bolster soft power dynamics.

Beyond just focusing on food production, there is a need to focus on producing nutritious food, reducing the environmental toll of production and boosting efficiency in transportation and handling. States can contribute to these developments, but corporations and institutions can also bring their capabilities to these daily efforts.

Designers have a civic role to play, as well, by looking at preserving productive soil, raising awareness to protect the chain of custody and reducing food waste. On a simple level, small, efficient plots of land can be used both for community gardening for personal consumption and agriculture to produce products for sale, which creates jobs and new revenue for communities. This can apply to workers' villages and communities of residents with rooftop, decentralized urban farming.

Offices, malls and governmental buildings also have ample opportunities to integrate productive greenwalls, vertical structures with crop-producing plants growing on them, that enhance visual environments and remind people of their responsibilities while providing revenue and reducing the transportation toll from traditional farmlands or air cargo to city centers.

Hydroponic innovations such as Qatar's Sahara Forest Project demonstrate the power of decentralized farming, which can be done horizontally on rooftops or on the vertical surfaces of tall buildings. These can be included in commercial and institutional developments; they feature technology that controls conditions and growing cycles to generate highly productive yields. These developments, which include techniques to grow food in deserts, create fresh options for projects and attractive design elements. Their newness and fast-emerging technological advancements provide opportunities for projects in Qatar to set the pace globally for urban farming and export methods to help solve one of the world's most serious challenges.

Centuries ago, a wide range of plants, some commonly eaten or used in cooking, were referenced in the Qur'an, which calls on people to live a responsible life and care for the world in all their choices. The Qur'ranic Botanic Garden project displays all the plants that grow in the region and others in an imaginative approach to raising awareness of the ethical link between respect for life cycles and the need to safeguard the seeds of life.

Qur'anic Botanic Garden is a specialized destination aiming at awakening a new awareness and creating a desire to re-integrate nature's bounty into our daily lives. It will work with Qatar Foundation nursery, the findings of the Sahara Forest Project and private and institutional pioneers to harness the power of decentralized urban farming to support more extensive traditional solutions. Some obsolete or unfinished tall urban structures can be recycled as urban farming hubs in addition to integrating urban farming zones inside projects, leveraging connectivity to create a network of organic farming small city markets; those markets become springboards of community social interaction, which creates stronger, more resilient communities in addition to greater food security and its immediate financial and environmental benefits.

QATAR NATIONAL MUSEUM
Visitors are welcomed into a refreshing transitional area, a lush promenade featuring the region's different varieties of date palms, which reflect that Qatar and other countries share connections to the iconic trees that have provided sustenance for centuries.

ALI BIN HAMAD AL ATTIYA ARENA

In hosting the World Cup and drawing the world's attention to the country, Qatar has chosen to place the constraints and power of global scrutiny on its treatment of foreign workers, including laws relating to immigration, construction-related activities and workers' housing and care.

4.2 Poverty Mitigation

> “Is there an assessment...of the socio-economic impact of construction and procurement for the project so lessons learned will better inform the corporation or institution for future projects?”

Poverty in the 21st century takes as many forms as there are cultures and environments. Amid these realities, design, construction and technology help vulnerable people in some countries survive and move beyond severe hardship. In creating its Sustainable Development Goals, the UN's first goal is clear: No Poverty. The report also reiterates that poverty has a width and breadth beyond money. "Poverty is more than the lack of income and resources to ensure a sustainable livelihood. Its manifestations include hunger and malnutrition, limited access to education and other basic services, social discrimination and exclusion."

In Qatar, the National Development Strategy 2 states prominently that the country's efforts in the field of climate change "are not limited to the local environment; they extend to solidarity and joint action as a global responsibility in the fight against hunger and poverty." The nation's pursuit of the FIFA World Cup 2022 was done with the nation's leaders' knowledge that a successful bid would draw further attention to the nation, its construction-related practices and legal protections for construction workers and laborers. The choice was made to bring this increased international attention to the country as a means to expedite improved treatment of lower-income expatriates. The nation has constructed several large venues for sports events, which have provided opportunities for the client, designers and contractors to further develop workers' welfare initiatives.

Strategies and techniques to help people in need – while retaining a focus on shareholders' requirements – include using technology such as quickly and affordably creating recyclable plastic frameworks. A number of these technologies can also be manufactured on-site or nearby and contribute to efficient progress on the project. Prefabrication, which includes structural elements and multi-trade MEP prefabricated corridor racks, expedites safe construction and creates jobs that help workers learn skills.

It takes a relatively short time to construct effective projects, but their effects – helping people live with dignity and meeting goals and requirements facing organizations that deliver the projects – can last for decades. Beyond issues of social responsibility and charitable support among institutions and corporations, the requirements of public sector projects for workers' welfare are increasingly numerous, as are relevant laws for private sector work.

In working to address poverty, either in projects explicitly intended to do so or as part of effective organizational responsibility, clients should ask themselves – and their architects and contractors – a number of leading questions:

- Does the project have the support of the people it is intended to serve, along with their input? For example, does the project leverage locally available resources such as skills and materials to create a positive local economic impact rather than relying on imported resources?
- Are specified or easily implementable locally accessible technologies used to improve onsite working conditions and those in off-site prefabrication areas? For example, is there a serious push in the design brief for local prefabrication solutions in partnership with eager entrepreneurs, who may develop the sector more efficiently if they know far enough in advance of programs that could generate big orders?
- Are design efforts and preferred manufacturers' selection criteria focused on workers' safety during construction onsite and their welfare during fabrication of the components in originating factories? For example, is there a consideration of working conditions in quarries when selecting natural stones?
- Is there an assessment, through collaboration with the relevant social responsibility team, of the socio-economic impact of construction and procurement for the project, so that lessons learned will better inform the corporation or institution for future projects?

EDUCATION CITY STADIUM
The air-conditioned stadium will have legacy uses for students of Education City, who can enjoy outdoor sports and fitness activities in the summer; the cutting-edge technology showcases the emphasis the Qatar Foundation and the state of Qatar place on the need for active, healthy lifestyles.

4.3 Health & Happiness

> “Projects such as masterplans or localized buildings in Qatar’s cities must address this challenge and participate in the attraction and retention of skilled workers amid competition between world cities.”

Partnership between countries and competition between countries is a well-known reality, one that is exacerbated by protectionist trends clashing with globalist agendas.

Countries build upon the strengths of their regions and cities, which creates natural competition between cities. Each competing city leverages territorial organization, urban design and place-making as tools for competitiveness.

The World Economic Forum report “Competitiveness of Cities” **(Ref. 4.3.1)** spells out that we can identify a four-part structure of city competitiveness involving:

- Institutions – governance or decision-making framework.
- Policies and regulation of the business environment.
- Hard connectivity – core physical infrastructure.
- Soft connectivity – the support for an open society in the city.

The report identifies that “The real answer to a single proposition of value in every city in the world is, in the end, a process of co-creation of value on a number of key pillars.” These are:

- A shared long-term view, under public leadership and implemented via multiple strategies, through specific instruments of management and financing, and with constant evaluation.
- Public-public and public-private partnerships.
- A socio-economic vector, directing the process in an integrated way to generate an area of competitiveness and well-being, both outward (international connectivity) and inward (inclusive).
- Self-government.
- Appropriating one’s own future.

This reflects that corporations and institutions must provide assets that enhance their host cities, rather than just wait for government action and policies to make areas more competitive and attractive.

With around 12 percent of its population being Qatari and 88 percent being expatriate (2018 census), Qatar is a global country where the challenge is to accommodate and leverage diverse international needs and preferences while preserving a homeland core and character.

Projects such as masterplans or localized buildings in Qatar’s cities must address this challenge and participate in the attraction and retention of skilled workers amid competition between world cities. Global cities understand that to attract an array of talents they have to diversify their educational, cultural and recreational facilities.

Qatar ranked 32 out of 156 in the 2018 World Happiness Report published by the Sustainable Development Solutions Network, **(Ref. 4.3.2)** which is based substantially on per capita GDP and social support, two elements in which Qatar is among the world’s leaders. Looking at it from a perspective that focuses less on GDP and social support elements, the country’s rank is not as high.

Ensuring the happiness of city dwellers and visitors, which includes health as a parameter, requires that architecture must be leveraged, not only on an urban planning, master planning and urban design scale but also on a building project scale.

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Cont’d.

AL SERDAL
The cantilevered living bridge offers diverse amenities and an open-air observation deck, creating a new social hub. Named Al Serdal, after the venerable sailor who commanded pearl diving trips, this piece of hard and soft connectivity contributes to the city's competitiveness and people's happiness.

VISITOR CENTER

The center invites visitors into a narrative promenade, where past, present and future are experienced in a non-linear loop. A restored heritage building links with new emerging forms in a dialectic contrast alluding–across a varied landscape -to the multiple layers, legacies and promises of the pursuit of happiness.

4.3 Health & Happiness

Mercer, a relocation specialist, ranks cities for their quality of life. In its 2018 report **(Ref. 4.3.3),** which uses a formula that does not consider income levels, Doha ranks 110th out of 231 cities. Mercer considers 39 specific areas within 10 sectors such as political and social environment, economic environment, socio-cultural environment and medical and health considerations. The scores attributed to each factor, which are weighted to reflect their importance to expatriates, make it easy to compare differences between any two locations.

These differences have an effect on the ability of businesses to hire and keep good people, according to Ilya Bonic, senior partner and president of Mercer's Talent business. "With increasing globalization and the changing demographic of the workforce, attracting and retaining the right talent is set to be one of the key challenges for businesses over the next five years," he said. "An increasingly diverse workforce is both more mobile and digital with highly diverging requirements and aspirations in terms of career, lifestyle and ultimately where and how they want to work. Companies need to consider these factors in their value proposition to both their local and their expatriate employees."

These realities highlight the need for amenities such as urban green spaces. The Greensurge publications **(Ref. 4.3.4)** note, "Up until now, it has been difficult for those who influence the future of green spaces, such as urban designers and planners, to make a clear business and policy case for why investment in these spaces is beneficial. As a result, green space is rarely given enough weight in decisions, leading to lack of investment, underprovision, loss of opportunity, and even overprovision of the wrong type of green space. Research released by Vivid Economics for the Greater London Authority revealed that the economic value of London's public green spaces is at least £5bn a year – or "£27 of value for every £1 spent by taxpayers."**(Ref. 4.3.5)**.

Qatar's leadership recognizes the need to address environmental concerns, which are among the factors that impact the overall health of an area's residents. A large section of the country's second National Development Strategy is devoted to addressing healthcare challenges. Other official documents describe plans to focus on groups within the population and meet their needs in part by providing care from neighborhood clinics and major hospitals.

While cost and time constraints can encourage decision-makers to choose relatively simple, inexpensive plans, healthy, active populations need integrated approaches, including urban green infrastructure, designed for specific cities and communities.

This clear reality further emphasizes that corporations and institutions have strategic roles to play in the national delivery of happy and healthy living environments. The sheer amount and scale of private developments cannot wait for the government to deliver everything through its programs. There is simply no way this will deliver an integrated solution that provides a return on investment for everyone.

The Education City stadium, also planned for use in the FIFA World Cup 2022, is an investment to provide an outdoor, cooled stadium, which serves as a multifunctional environment that enhances health and happiness for city students and residents to enjoy throughout the year.

For the West Bay North Beach development, the emergence of new metropolitan areas such as Lusail and Msheireb Downtown required a redefinition of West Bay to engage with emerging real estate trends that motivate new generations of people and fill gaps in urban green infrastructure. This project creates the opportunity to activate the urban realm. It acts as a catalyst for multilayered upgrades and additions to the existing office and residential structures.

The 'play' layers that will be enjoyed will contribute to a 24/7 urban live-work-play mix that responds to expectations of the new generations of urban dwellers. The beach fringe invites owners of rental residential towers to offer a new layer of mixed-use facilities at the interface, providing additional profits for building owners while offering additional amenities for residents and visitors.

References

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Ref.4.3.4: Green Surge (2015), Green Surge Report.
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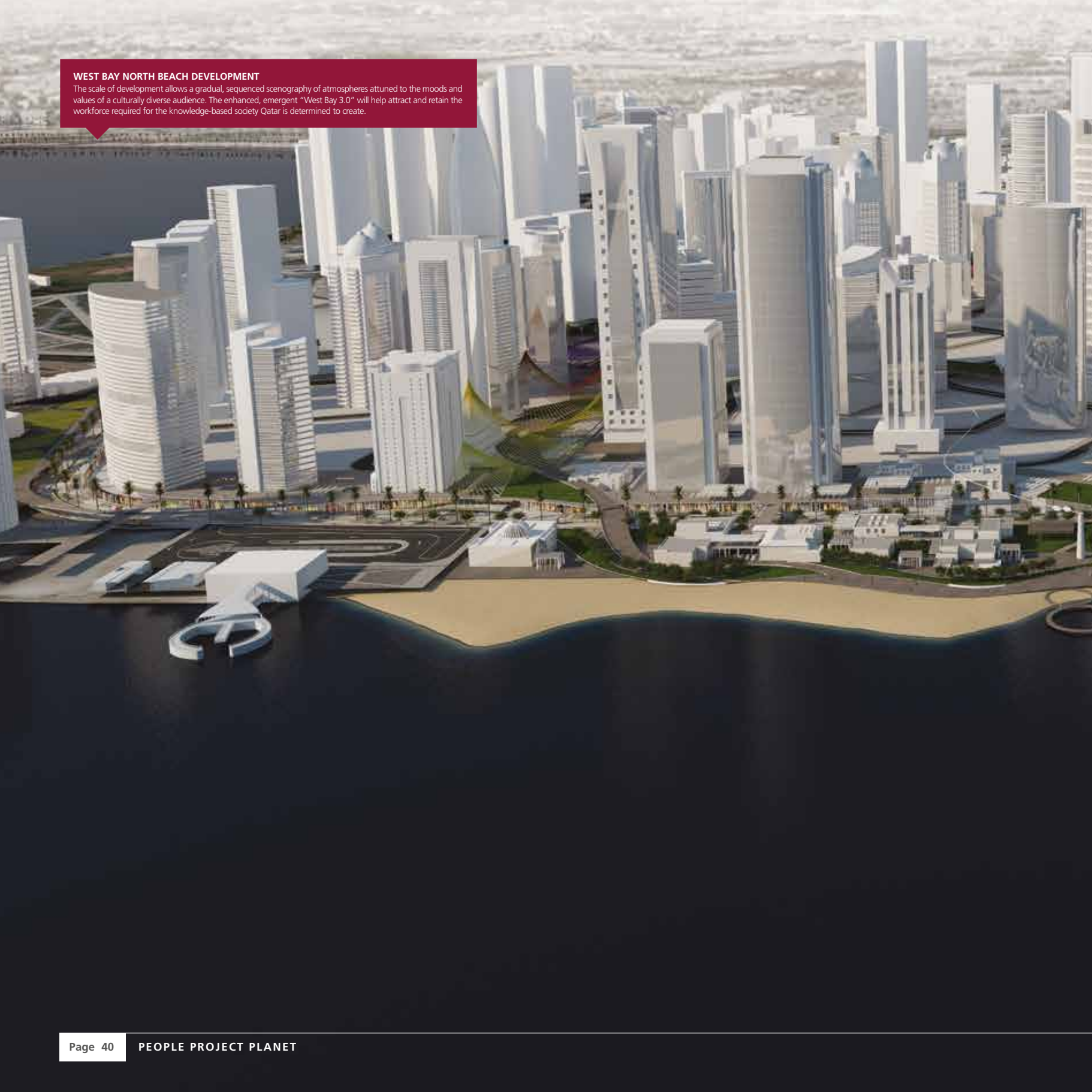

WEST BAY NORTH BEACH DEVELOPMENT
The scale of development allows a gradual, sequenced scenography of atmospheres attuned to the moods and values of a culturally diverse audience. The enhanced, emergent "West Bay 3.0" will help attract and retain the workforce required for the knowledge-based society Qatar is determined to create.

WEST BAY NORTH BEACH DEVELOPMENT
The project provides a pedestrian- and business-friendly fringe interwoven with the existing developments. Its city-by-the-beach character empowers and entertains global and local citizens. The 24/7 urban live-work-play mix responds to expectations of the new generations of urban dwellers.

MATHAF: ARAB MUSEUM OF MODERN ART
The careful selection of contemporary and recent art is one way to commemorate contributions of local and regional female artists and subjects. This choice subtly and effectively shapes the community's ever-evolving collective memory and strategic narrative about gender equality.

4.4 Gender Equality

> Several studies have established a link between women's employment and various business benefits, such as increased productivity, retention and strong performance.

The International Finance Corporation publication "She Works: Putting Gender-Smart Commitments into Practice at the Workplace" **(Ref. 4.4.1)** reminds us that ensuring professional gender equality is an essential component of creating successful corporations, institutions and living environments.

"When female employees are unable to realize their full economic potential, businesses, communities, and economies also fall behind, unable to maximize their growth potential. Evidence of this is being substantiated by a growing body of research covering developed and emerging economies."

Climate change experts note that educating girls is an effective way to fight climate change. Project Drawdown **(Ref. 4.4.2)**, a coalition of scientists, business leaders and others that has assembled information on climate solutions, published a list of the 100 most effective ways to address climate change. Educating Girls is number 6.

"Education lays a foundation for vibrant lives for girls and women, their families, and their communities," the organization said in its report. "It also is one of the most powerful levers available for avoiding emissions by curbing population growth. Women with more years of education have fewer and healthier children. Education also shores up resilience and equips girls and women to face the impacts of climate change. They can be more effective stewards of food, soil, trees and water, even as nature's cycles change."

The report "Women's Careers in the GCC" **(Ref. 4.4.3)** was compiled based on an extensive survey of women in managerial and senior leadership roles across the Gulf Cooperation Council. It sets out five recommendations to CEOs:

- Improve work/life balance: flexible working is central to this, with performance appraisals based on achievements rather than time spent in the office.
- Create a balanced culture: CEOs can play a vital role by visibly supporting women at work. The key is to ensure more women reach senior positions; the tone in the middle will take its cue from the tone at the top.
- Invest in building career paths, including more support and mentoring for talented women and diversity training for men.
- Adopt HR policies that ensure equity in the workplace, including policies on recruitment, pay and promotion, and targets for numbers of women at each managerial level.
- Be an advocate in the wider community, by using their own public profile to raise awareness of the value of a more diverse workplace, and the contributions talented women make.

The orientation of architecture and design promoting gender equality tends to focus more on cultural realities regarding women's current positions in society, less on ensuring that their aspirations are met. There are a number of practical considerations that clients should address to facilitate progress:

- Designs of play areas, parks and theme parks can create and reinforce young children's views about gender stereotypes.

References

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EDUCATION CITY TRAM STOP
To ensure gender equality and not undermine the affirmed co-education and inclusive character of the campus, the air-conditioned, glazed waiting rooms of each platform have been shifted from a central position to prevent the slanted central pillars from creating a segregation risk.

4.4 Gender Equality

- In countries where women's active participation in the workforce still requires active support, dedicated building entrances and elevators for women may be a paradoxical solution to ease the behavioural shift for some decades.
- Providing onsite nurseries facilitates the engagement and retention of professionals with children by improving the work/life balance.
- Ensuring open and inviting self-serving cafes are provided, rather than cramped pantries, develops collaboration and informal professional exchange, which promotes a balanced culture across genders and generations.

A gender equality mindset is a significant part of the UN Strategic Development Goals and is addressed in facets of Qatar's National Development Strategy, which notes challenges relating to education, cultural enrichment, sports and public safety.

Qatar's Fourth National Human Development Report **(Ref. 4.4.4)** highlights that:

- Qatar was the highest-ranked Gulf country (31st place) on UNDP's HDI (Human Development Index), but it had a very low international ranking, 114 out of 152 countries in the Gender Inequality Index.
- While female labor force participation has increased and is high by GCC standards, it is still low compared with countries at similar levels of economic and human development.
- Women's participation in key decision-making processes needs to be strengthened. Their greater participation at the legislative level and expanded opportunities in senior governmental decision-making bodies would enable them to play key roles in development and in the advancement of women.

Across public life, social development under the Qatar National Vision 2030 "encompasses a system dedicated to social welfare and protection for all citizens and to bolstering women's role in society and empowering them to be active community members." The document calls for a sound social structure that will "enhance women's capabilities and empower them to participate fully in the political spheres, especially in decision-making roles." Such an environment will "develop a spirit of tolerance, constructive dialogue and openness toward others at the national and international levels."

To promote gender equality in their built environments, corporate and official clients should consider several leading questions to strategically inform a design brief that will contractually mandate and challenge the design team to provide integrated answers:

- Does the design provide a culturally aware level of privacy without creating segregation?
- Is the design flexible, allowing easy adaptation to changing cultural norms related to co-use of public, semi-public and private space?
- Does the design support the integration of women in institutional and public roles?
- Does the design of women's-only spaces such as prayer rooms and restroom facilities reflect that women have equal status?
- Does the design process include women who are designers, members of the client team and those who will use the facility?
- Does the design integrate all members of the family in the tasks of nurturing and creating a positive experience of domestic life?

When faced with the spatial challenge created by the structural need for a middle-span slanted pillar on each side of waiting platforms for Education City tram stops, Qatar Foundation had to decide whether the elongated and air-conditioned waiting rooms centrally located on each platform would be split in two by the mid-span pillar. To ensure gender equality and not undermine the affirmed co-education and inclusive character of the campus, the decision was made to shift the location of the waiting rooms and provide one undivided waiting room on each platform. This change prevents tram users from consciously or unconsciously segregating themselves by gender in the waiting rooms. This segregation likely would have continued in the shuttles, which would have significantly undermined community connectedness, which is an important benefit of the tram system.

References

Ref.4.4.4: Ministry of Development Planning and Statistics (2015), Realising Qatar National Vision 2030 The Right to Development.
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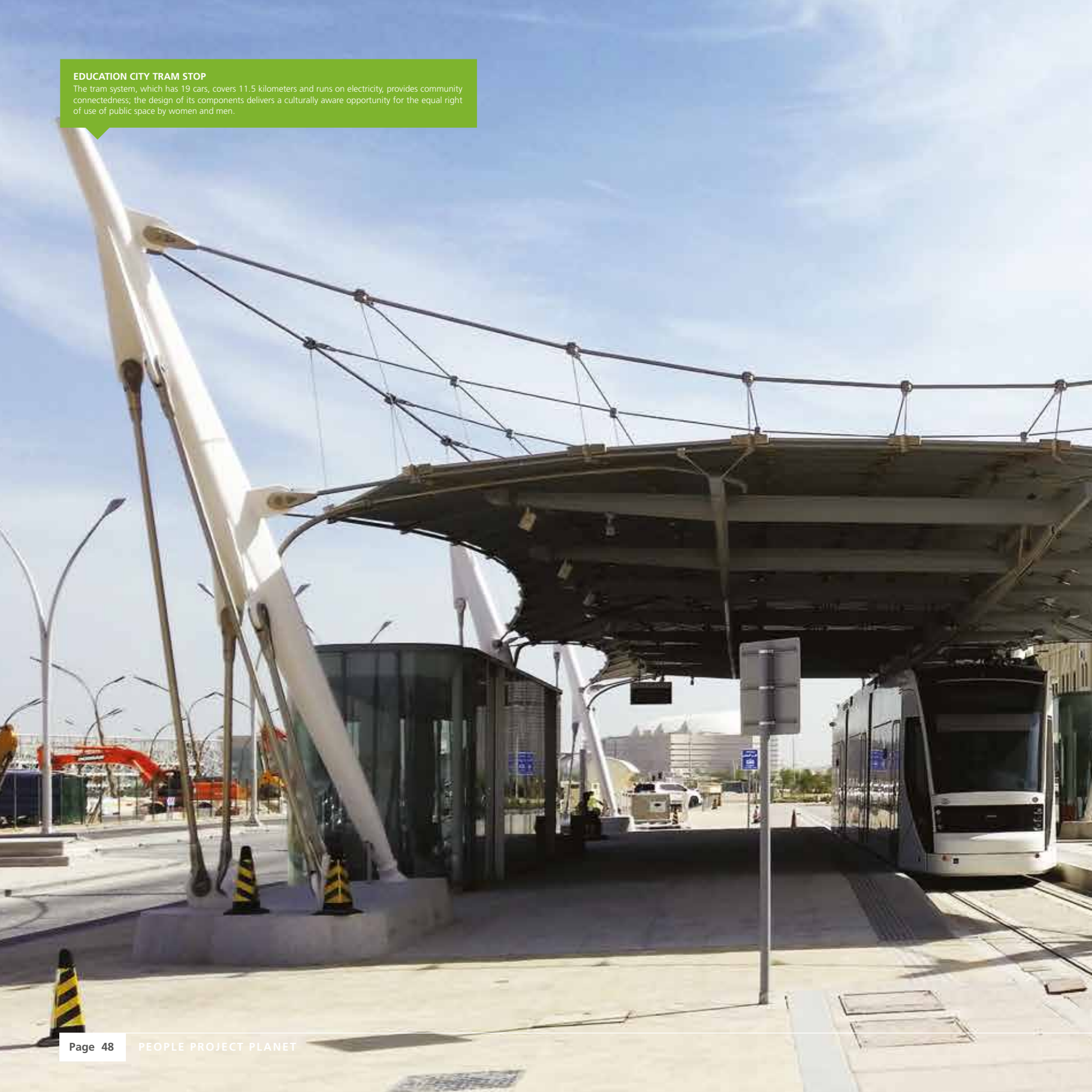

EDUCATION CITY TRAM STOP
The tram system, which has 19 cars, covers 11.5 kilometers and runs on electricity, provides community connectedness; the design of its components delivers a culturally aware opportunity for the equal right of use of public space by women and men.

QATAR NATIONAL LIBRARY
The library, at the edge of Education City, serves students and all residents of Qatar. A variety of environments provides appealing spaces for people of all generations and inspires people to read, learn new skills and maintain a personal culture of lifelong education.

4.5 Community Education

> “Leveraging architecture for community education must address the need for adults to have opportunities for learning new skills and lifelong learning.”

Challenging locations and funding constraints can drive innovators to use natural terrain, locally available material and technology to create effective, affordable learning environments. Diverse as the challenges and effective responses have been, there is worldwide agreement on the value of education, as a human right and as an essential component of a country’s success.

Achieving inclusive and equitable quality education for all will require increasing efforts:

- In 2014, about 2 in 3 children worldwide participated in pre-primary or primary education in the year prior to official entry age for primary school. However, in the least developed countries, the ratio was only 4 in 10.
- Despite considerable gains in education enrollment over the past 15 years, worldwide, the adjusted net enrollment rates were 91 percent for primary education, 84 percent for lower secondary education and 63 percent for upper secondary education in 2014. About 263 million children and youths were out of school, including 61 million children of primary school age. Sub-Saharan Africa and Southern Asia account for over 70 percent of the global out of school population in primary and secondary education.
- Equity issues constitute a major challenge in education, according to a recent assessment. In all countries with data, children from the richest 20 percent of households achieved greater proficiency in reading at the end of their primary and lower secondary education than children from the poorest 20 percent of households. In most countries with data, urban children scored higher in reading than rural children.
- On the basis of data from 65 developing countries, the average percentage of schools with access to computers and the Internet for teaching purposes is above 60 percent in both primary and secondary education. However, the share is less than 40 percent in more than half of Sub-Saharan countries **(Ref. 4.5.1)**.

The UN SDG target is: “By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship” **(Ref. 4.5.2)**.

In this global context, Qatar’s leaders have a social and political vision that calls for improving the outcomes of the Qatari K-12 education system. Some 10 years ago, Qatar embarked on reforming its K-12 education, with plans including internationally benchmarked curriculum standards, national testing based on those standards, independent government-funded schools and parental choice among schools. The schools themselves include contemporary technology with future-proofed capabilities, along with designs and features that support the country’s education reforms.

In any environment, regardless of its wealth or hardships, architecture can deliver designs for educational facilities that address local realities. Progressive building design and making the best use of resources, particularly if they are limited, is an important element of effective learning from K-12 through higher education, adult education and community learning.

References

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TAREK IBN ZIAD SCHOOL FOR BOYS
This experimental school was designed to deliver and refine a new curriculum to raise standards in Arabic, math and science. Recognizing that physical activity is an important habit to learn and enjoy, the school features substantial recreation areas and an arena with a retractable roof.

4.5 Community Education

In a refugee camp in East Africa, the Kakuma School for Better Life serves refugees from dozens of nations. The School focuses on education and restoration of dignity for refugees, many of whom are educated and held high-level positions before they were displaced. The site includes areas where people can grow their own vegetables, learn construction and earn money from their efforts. The complex includes a wall, with colors chosen by people from the color of the flags of 40 different nationalities who have spent time there. The mosaic of colors is a symbol of unity within Kakuma, essentially the school's own flag.

Kakuma's School provides benefits to acutely challenged young people and adults, amid global calls for heightened attention to adult education and lifelong learning focus on their benefits to individuals, communities and nations:

- Adult education represents a significant component of the lifelong learning process, which embraces a learning continuum from formal to non-formal to informal.
- Adult education centers and community learning centers have significant impacts on other sectors. Activities can contribute to improved health and well-being, gender equality, reducing inequality, conflict prevention and promotion of peace **(Ref. 4.5.3)**.
- "While much has been said about the need for reform in basic education, it is simply not possible to weather the current technological revolution by waiting for the next generation's workforce to become better prepared. Instead it is critical that businesses take an active role in supporting their current workforces through retraining, that individuals take a proactive approach to their own lifelong learning and that governments create the enabling environment, rapidly and creatively, to assist these efforts. In particular, business collaboration within industries to create larger pools of skilled talent will become indispensable, as will multi-sector skilling partnerships that leverage the very same collaborative models that underpin many of the technology-driven business changes underway today." **(Ref. 4.5.4)**.

When diving deeper into the regional challenges, realities and opportunities, analysts note:

- "While the bulk of the region's population is young, for those cohorts that are already part of the workforce, there is a need for both a culture of lifelong learning as well as the infrastructure that can help make such continued learning and training feasible. This is particularly necessary due to the rapid technological developments taking place in the global labor market, even for those who are highly educated. The region's backlog of unemployed and underemployed people in particular, will benefit from the rapid provision of reskilling and upskilling opportunities and a shift towards a more holistic approach for encouraging and recognizing skills acquisition across all types of training. More learning will need to take place in the workplace, in collaboration with governments, schools, universities and non-formal education providers, to build more resilient talent pools in the region. In part, employers can facilitate this by fostering more innovative, equitable and less hierarchical work cultures and addressing multigenerational workplaces." **(Ref. 4.5.5)**.

Leveraging architecture for community education must address the need for adults to have opportunities for learning new skills and lifelong learning. Institutions and corporations need to collaborate with building designers to understand how each building can:

- Deliver educational messages, sometimes operationally curated and sometimes passively embedded, about end-user activity and ensure that they align with key UN strategic goals and Qatar's National Development Strategy components.
- Provide opportunities for opening parts of facilities and programs to community access to provide a community learning infrastructure at civic scale.

References

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SCHOOL FOR BETTER LIFE - KAKUMA REFUGEE CAMP
The school, in a refugee complex that draws people from several countries, reflects that community education includes everyone. Adults are included and receive opportunities to learn and work. The school was built using local materials and labor, which provided income to workers and elevated their dignity.

MINISTRY OF EDUCATION AND HIGHER EDUCATION
After research in the mid-2000s, Qatar initiated its Education for a New Era program. The Ministry of Education and Higher Education contributed to the drive for efficiency by bringing the elements of its organization to one location, with the site layout highlighting the synergies between its institutes and departments.

4.5 Community Education

- Provide opportunities for exposure of active and passive users to solutions creating important, long-lasting and wide-impact behavioral changes such as new urban mobility solutions to include driverless vehicles for example.
- Provide a juxtaposition of contemporary and tradition-conscious approaches that showcase a cultural translation mindset.
- Use ICT for user-friendliness, engagement with passive users and digital/physical interactivity.

Clients and their building designers must consider each project as a building block of a learning city, defined as "a city that effectively mobilizes its resources in every sector to promote inclusive learning from basic to higher education; revitalizes learning in families and communities; facilitates learning for and in the workplace; extends the use of modern learning technologies; enhances quality and excellence in learning; and fosters a culture of learning throughout life. In doing so, it will enhance individual empowerment, social cohesion, economic and cultural prosperity, and sustainable development." **(Ref. 4.5.6)**.

The Qatar National Library was initially destined to be just the central library for Education City, but Qatar's leadership recognized its critical potential to be part of the national drive to establish adult education centers and community learning centers that are necessary for the nation's continuous development. Its key local and national roles are articulated through:

- Direct exposure to new urban mobility solutions in the form of a Metro stop and an Education City tram stop along an important boulevard.
- The rich blend of a heritage library and a contemporary library.
- Sharing opportunities of multiple zones allowing co-activity and corporate activation of the institution, departing from the tired model of libraries being silent enclaves.
- Multigenerational programming providing all access in one centralized forum, exposing the vibrancy of users' origins.
- The function of the building as a "soft fringe" of Education City, providing a buffer zone between the public space and the more internalized campus elements of Education City.
- Using technology and providing access to it for easy transactions and creative activities.

References

Ref.4.5.6: UNESCO Institute for Lifelong Learning (2017), Learning Cities and the SDGs: A Guide to Action.
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AUTO MUSEUM
The proposed structure, located in a public park, and its reflective design connect visitors and passersby to the automobile's disruptive influence on Qatar's nomadic culture and on the world, including the historic rise of the Arabian Gulf region's geostrategic importance for oil and gas supply.

2015

The building draws from the timeless minerality of Islamic architecture with a pure geometric exterior providing a dialectic contrast with transparent and vibrant interior clusters gathered around an outdoor exposed vertical courtyard. The blend of traditional and contemporary symbols is a visual representation of the innovative drive to develop society and culture while respecting tradition.

4.6 Inclusion and Positive Peace

> "Interest rates are lower and more stable in highly peaceful countries, as is the rate of inflation. Foreign direct investment is more than twice as high in highly peaceful countries."

Globally, regionally and domestically, there's much solid evidence that the world is not becoming more inclusive and peaceful. UN SDG 16 reporting states **(Ref.4.6.1):** "Violent conflicts have increased in recent years, while homicides have declined slowly and more citizens around the world have better access to justice. A few high-intensity armed conflicts are causing large numbers of civilian casualties. Progress promoting peace and justice, together with effective, accountable and inclusive institutions, remains uneven across and within regions."

The Global Peace Index 2018 report **(Ref.4.6.2)** analysis states: "The Middle East and North Africa (MENA) region recorded an improvement in peacefulness for only the third time in the last eleven years. Despite the improvement, it remains the world's least peaceful region, a position it has held since 2015.

Regarding the specific case of Qatar, the same report shows that Qatar ranks 56th in 2018 against 30th in 2017. Qatar's score deteriorated due to regional tensions.

The Global Peace Index 2018 report finds that "peacefulness has a considerable impact on macroeconomic performance. In the last 70 years, per capita growth has been three times higher in highly peaceful countries when compared to countries with low levels of peace. The difference is even stronger when looking at changes in peacefulness, with the report finding that per capita GDP growth has been seven times higher over the last decade in countries that improved in peacefulness versus those that deteriorated. Interest rates are lower and more stable in highly peaceful countries, as is the rate of inflation. Foreign direct investment is more than twice as high in highly peaceful countries. In total, if the least peaceful countries had grown at the same rate as highly peaceful countries, the global economy would be almost 14 trillion dollars larger."

The Global Peace Index report 2017 **(Ref.4.6.3)** relates that: "The analysis finds that different factors become more important at differing stages. In low-peace environments, the factors that matter the most are related to Well-Functioning Government, Low Levels of Corruption, Acceptance of the Rights of Others and Good Relations with Neighbors. In these settings, security and rule of law are the most important factors within the Well-Functioning Government Pillar. For countries at the mid level of peace, the Free Flow of Information and Sound Business Environment rise in importance. In order for countries to rank at the top of the GPI they must score well on all eight Pillars of Positive Peace, underlying the systemic nature of Positive Peace."

Positive Peace is defined in the GPI 2018 report as "the attitudes, institutions, and structures that create and sustain peaceful societies. These same factors also lead to many other positive outcomes which societies consider are important. Therefore, Positive Peace describes an optimum environment for human potential to flourish."

According to GPI reports, "Positive Peace factors can be used as the basis for empirically measuring a country's resilience, or its ability to absorb and recover from shocks. It can also be used to measure

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QATAR NATIONAL MUSEUM
The museum, which embraces an inclusive view of the nation's history and culture, is built around the original palace of Sheikh Abdullah bin Jassim Al-Thani, the father of modern Qatar. The recently restored structure was his family home and the site of Qatar's government.

4.6 Inclusion and Positive Peace

fragility and to help predict the likelihood of conflict, violence, and instability."

The eight pillars of Positive Peace are:

- Well-functioning government.
- Sound business environment.
- Acceptance of the rights of others.
- Good relations with neighbours.
- Free flow of information.
- High levels of human capital.
- Low levels of corruption.
- Equitable distribution of resources.

To address these issues, clients and their designers embarking on the creation, articulation or modification of a facility or environment should review the City Resilience Index method **(Ref.4.6.4)**, which provides a range of relevant goals and indicators:

Collective identity and community support

Local Community Support
Cohesive social structures providing support at individual, household and local community levels.

Cohesive communities
Cohesive, harmonized communities across the city.

Strong city-wide identity and culture
Cohesive local identity and culture, in which all citizens feel a sense of belonging in the city.

Actively engaged citizens
Citizens actively engage, express opinion and participate within society.

Comprehensive security and rule of law

Effective systems to deter crime
Integrated, collaborative and resourceful mechanisms to deter crime.

Proactive corruption prevention
Fair and transparent systems to fight corruption and promote justice.

Competent policing
Effective policing measures and systems for a safe and secure city.

Accessible criminal and civil justice
Effective, affordable, impartial and accessible mechanisms to promote justice and resolve civil disputes.

Sustainable economy

Well-managed public finances
Adequate public finances and sound fiscal management.

Comprehensive business continuity planning
Resourceful, reflective and flexible business continuity planning across both public and private sectors.

Diverse economic base
Robust, flexible and diverse local economy.

Attractive business environment
Diverse and resourceful investments within the city, driven by a strong urban brand and economic and social environment.

Strong integration with regional and global economies
Strong integration between the city's economy and wider economic systems.

These summarized goals and indicators can be used by clients and their designers as frameworks for useful leading questions related to strategic design briefing:

- How is the building design offering an inviting, inspiring and activated "civic majlis" accessible to everyone?
- How is the design inclusive beyond the obvious necessary attention to physically disabled users? **(Ref.4.6.5)**
- How are interactive ICT innovative solutions integrated in the building environment and offered to public visitors for their participation, and for transparent reinforcement and broadcasting of the institution's values and achievements?
- How is the designed environment showcasing cutting-edge and

References

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QATAR PETROLEUM DISTRICT
With several public areas, cafes and conference rooms, the District, which features 9 office buildings, is both an anchor to the CBD and an appealing, inclusive area that brings people together for work, enjoyment and events hosted in its conference center.

4.6 Inclusion and Positive Peace

pilot projects of other partnering institutions for direct public benefit including urban mobility?

- How is the design contributing a sense of belonging and identity to the neighborhood within the city while also contributing and providing exposure to the city's global image and brand?
- How is the design showcasing a situational awareness of the heritage and history of its context?

Taking all these questions and ambitions into consideration, Qatar Foundation Headquarters building is a prime example of a design fostering Positive Peace and strong institutions.

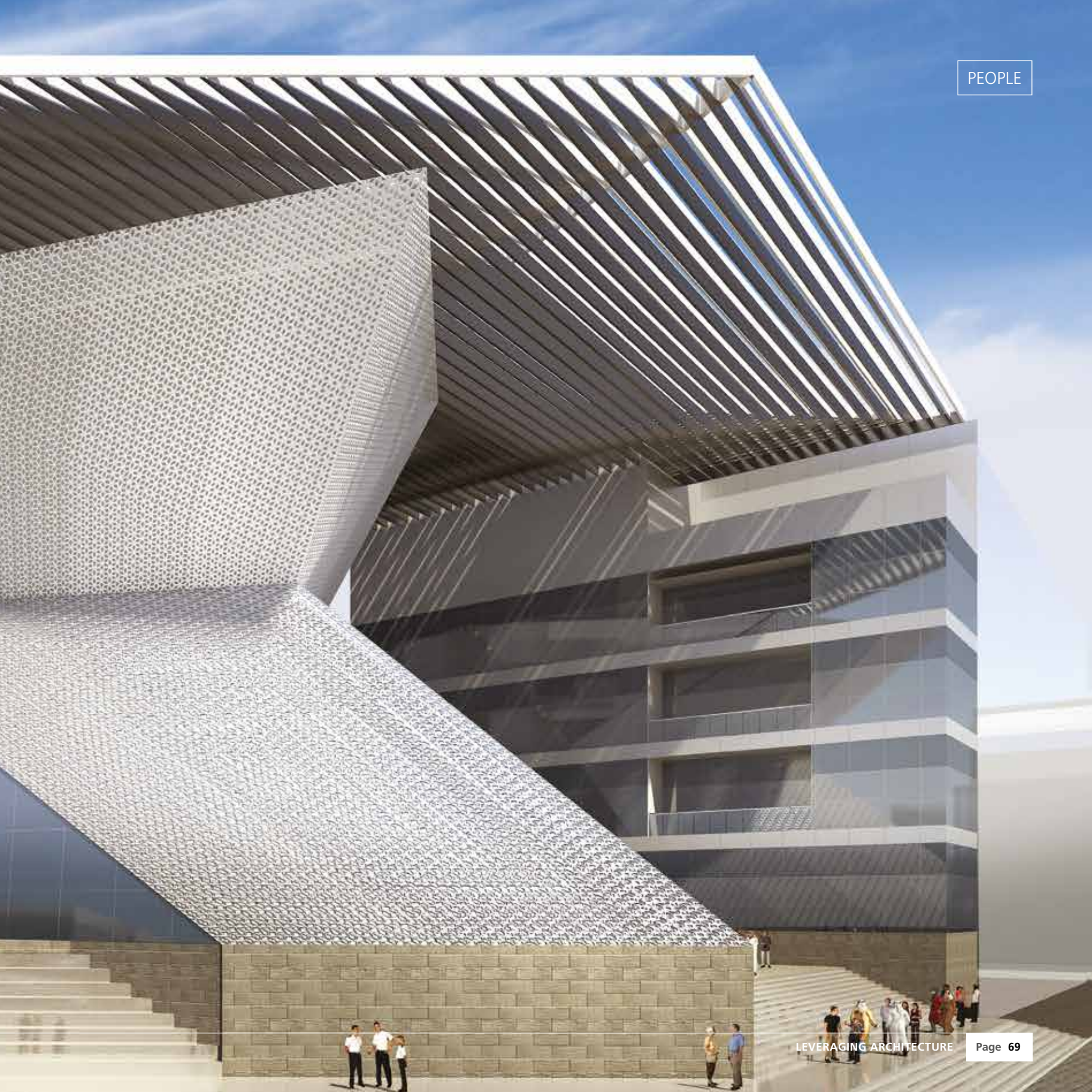
The building understands its location outside of the West Bay Central Business District and as part of Education City and the Al Rayyan neighborhood, deploys a seemingly conservative exterior design with the mashrabiya translated image on the external concrete screen.

This is an innovative, bold structural design for the purpose of showcasing the horizon of West Bay, with its panoramic elevated terrace, and also the wide urban landscapes of Al Rayyan and Education City.

A multifaceted, sculptural indoor atrium composition reveals natural light and visually accessible courtyards. Platform realms structured around the values of transparency and innovation reflect an organization that is continuously building itself, in dialectic contrast with the outdoor, grid-like façade. The building is strongly connected to the rest of the campus in the most literal sense, with two adjacent tramway stops.

MINARETEIN
The inviting, contemporary design of the complex and its mosque provides a counterbalance to some clichés about Islam that are conveyed by adversaries of alliances of civilizations and it broadcasts ambitions of a future-ready institution.

STOCK EXCHANGE HEADQUARTERS
The structure reflects the institution's significance and its transparent, open approach by being open in a literal sense, with a civic plinth topped by an accessible, shaded public plaza. The structure also highlights the importance of public participation in the knowledge-based economy and its necessary financial structures.



5. Project

CRUISE TERMINAL
The proposed complex, with room for two 5,500-passenger ships, features a wide ramp to a public rooftop park with views across the bay. The park provides an appealing community space for residents and an opportunity for visitors to relax, meet people, see and understand the city.

5.1 Viable Cities & Communities

> “Viable cities are made of buildings and facilities promoting connectivity and integration..., future-ready strategic narrative and offering resilient safe havens against disruptive unforeseen changes.”

This millennium is an urban millennium. It is projected that by 2050, two-thirds of the planet's population will live in cities, which currently account for 70 percent of the planet's GDP. Now and in the decades to come, it will be ever more important – and increasingly required by stakeholders – to create viable cities and communities.

Viable cities are made of buildings and facilities promoting connectivity and integration, enabling the unfolding of an inclusive, future-ready strategic narrative and offering resilient safe havens against disruptive unforeseen changes.

Institutions and corporations must pay critical attention to the ways buildings and facilities (including parks and public areas) can contribute to viability in cities and communities. Every addition is important, all the more because the effort put into one facility can be multiplied on an urban development scale if it works in synergy with a greater context.

Any drive for iconic, eye-catching developments and facilities should therefore be put on equal footing with the imperative for enabling a truly viable – safe, rewarding and sustainable – living experience in urban communities.

Qatar National Development Strategy 2 (QNDS 2) identifies in its Chapter 1 - Part VI, sector outcome 4: More sustainable urbanization and a healthier living environment that the target is to “establish three shady green space corridors in Doha and monitor their effect on health and air quality in urban areas.” This identifies that one of the key characteristics of a viable city is the provision of outdoor softscaped civic space that can be used by a wide range of people for diverse events and activities.

Meeting the QNDS 2 sustainable urbanization required outcome can be addressed by adhering to the UN HABITAT III conference's New Urban Agenda **(Ref. 5.1.1).**

The World Bank fully understands the synergetic economic and social impact of viable urban developments as it leads the Global Platform for Sustainable Cities (GPSC), which is supported by the Global Environment Facility (GEF) borne out of the 1992 Rio Earth Summit.

A framework for measuring progress and results in implementing and operating viable cities is provided by the KPMG report “The Future of Cities: Measuring Sustainability **(Ref. 5.1.2).** The consulting firm insists on the need for validation and standardization of data and measurements. This critical hurdle of standardized metrics for cities is now much more easily addressed with the availability of ISO 37120 “Sustainable cities and communities-indicators for city services and quality of life.” This ISO standard helps measure cities' livability and compares the results with other cities that have adopted the same standard.

Without necessarily pursuing a formal rating of the community and city under frameworks such as GSAS Districts and Infrastructure or the STAR Community Rating System of the U.S. Green Building Council LEED ND, it is valuable for clients to challenge their designers and architects to develop a livable design for a city or community with a framework that shares key objectives and outcomes of the STAR

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CRUISE TERMINAL
The terminal allows a direct indoor connection to the cruise boats with relocatable passenger boarding bridges. Passengers connect directly to arrival/departure lounges with wide views to the city and the sea and easy connection to the rooftop public park. Residents and tourists have an early introduction straight from arrival.

5.1 Viable Cities & Communities

system **(Ref. 5.1.3).**

A significant number of the system's outcome measure items are aligned with UN SDG 11, which addresses Sustainable Cities and Communities **(Ref. 5.1.4)**.

The ISO 37120 standard also has some alignment with the STAR Communities rating system **(Ref. 5.1.5).** Clients can make their projects greatly benefit – when looking at the contribution of their project to viability in cities and communities – from leveraging architecture and urban design to answer five key questions:

- What solutions encourage local private and civic engagement?
- How is the project supporting inclusion with social innovation?
- What are the data-driven, scientific planning and decision-making processes applied to the project's urban design?
- What are the resilience solutions proposed to address future risks, especially climate change?
- What solutions are offered by the localized project to spur specific national-level strategies regarding viable cities and communities?

One increasingly popular and effective way to address these and other questions relating to the creation of sustainable and desirable urban communities is the transit-oriented development.

Locally and across the world, there is an ever-greater focus on transit-oriented developments, which is to say that the locations–and points within the complexes–are easily accessed by public transportation, walking and bicycling. In Qatar, projects such as Hamad Hospital Transit Oriented Development provide efficient access via public transportation, residence, onsite shops and restaurants to reduce residents' needs to travel and easy car-free travel within the site. Provision of the transit-oriented component for sites such as hospitals will increase sustainability and quality of life for workers, patients and visitors.

A cruise ship terminal proposed for Qatar would facilitate transportation into and out of the country and provide an appealing public park. The complex, which can accommodate two 5,000-passenger ships, features a wide ramp that provides easy pedestrian and cycling access to a public rooftop park. With residents and ship passengers from around the world enjoying the park before their departures and after their arrivals, the community space will foster cross-cultural interaction in a green, healthy environment. Sweeping views of the city and its skyline will foster greater understanding of the urban environment.

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TRANSIT-ORIENTED DEVELOPMENT - HAMAD HOSPITAL
This mixed-use development leverages direct Metro connectivity and immediate proximity to hospitals to provide its community with a truly sustainable environment. The site includes residences for medical professionals along with shops and restaurants for residents, hospital visitors and the public.

ALI BIN HAMAD AL ATTIYA ARENA
Home to the country's ice hockey federation, the venue is recognized internationally for sustainability. The 7,700-seat facility features 100 percent graywater recycling and reuse; it uses 30 percent less energy than other arenas of its size and 20 percent of the construction materials were recycled content.

5.2 Sustainable Energy

> “...building owners will incorporate health and wellness principles into projects and implement design strategies to improve building resilience.”

The imperative to reduce air pollution and mitigate climate change demands increased investment in the use of renewable energy.

One of seven major components of Qatar’s National Development Strategy 2 is devoted to sustainable development. Globally, the UN’s Sustainable Development Goals include the call to “ensure access to affordable, reliable, sustainable and modern energy for all.”

As explained in QNDS 2, Part 3, Chapter 1, a required Intermediate Outcome 3 for Qatar’s infrastructure is diversifying the locally produced energy mix. As one example of ongoing efforts to do so, Kahramaa is developing a plan to generate 200 megawatts of solar energy by 2020. Execution of the broader ambition requires development of a renewable energy policy and laying down rules governing charges, procurement and connectivity to the main electrical grid.

Extensive local research in Qatar Science and Technology Park and significant reductions in the cost of photovoltaic solar panels both demonstrate that the optimum renewable energy solution (efficiency and affordability) for Qatar is solar energy. Solar panels have dropped in price about 10 percent annually since 1980. A major part of Qatar’s plans – which are aligned with GCC targets – calls for solar energy to produce 20 percent of the country’s electricity by 2030.

For an energy exporter like Qatar there is a strategic benefit to investing in renewable energy like solar power: less locally produced oil and gas is used, which leaves more to be exported.

China installed 9.65 gigawatts of solar capacity in the first quarter of 2018 alone. This is the power equivalent of 10 large nuclear plants **(Ref. 5.2.1)**.

Developments in China and numerous other countries reflect that there is now an abundance of benchmark solutions around the world regarding renewable (solar) energy policy and rules governing charges, procurement and connecting to electrical grids. Looking ahead, the vast, rapid, seemingly unstoppable expansion of the electrical vehicles market – to include plans to manufacture electric cars in Qatar – creates an opportunity to focus more on the benefits of solar-powered micro-grids and delocalized power generation.

Qatar’s corporations and institutions must take the initiative and:

- Create their own renewable energy goals, KPIs, policies and procedures.
- Sign MOUs with Kahramaa to increase the renewable portion of the local energy mix.
- Invest in generating solar power at their projects’ locations.
- Adopt sustainability rating systems promoting use of renewable energy including especially solar-based energy.

Renewable energy efforts go hand-in-hand with efforts to reduce energy consumption, including passive design, features and materials that reduce energy consumption for facilities of all sizes.

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SOUTHNEST (QATAR FOUNDATION STUDENT HOUSING – PHASE 1)
Internationally recognized for sustainability, Southnest features artfully designed wind turbines, strategically placed near building entrances for maximum visibility. The complex, which includes car shading covered with solar panels, earned 12 Platinum LEED certifications from the U.S. Green Building Council.

5.2 Sustainable Energy

According to a recent Morgan Stanley Research report **(Ref. 5.2.2)**, the return on investment in energy-efficient features is substantial; it can lower the cost of ownership by 50 percent for commercial buildings. In addition to significant savings, corporations and institutions can publicize these efforts to promote their clean energy credentials.

A report from the Urban Land Institute **(Ref. 5.2.3)** details how project developers are improving sustainability in their projects through imaginative approaches such as:

- Investing in innovations.
- Changing utility relationships.
- Expanding the definition of sustainability.
- Managing what's measured.

It can be challenging to know whether your project uses technology "that will meet expectations and function over the life of the asset," the report acknowledges. Working closely with young companies and incubators allows developers to have input into development while the companies develop better understandings of market needs and realities.

More and more, utility companies are doing more than simply providing power. Incentives can be leveraged to make sound investments with technologies like battery storage and peak-shedding programs by improving building energy efficiency and reducing operating expenses.

The definition of a sustainable building continues to evolve, with expectations that building owners will incorporate health and wellness principles into projects and automated demand response by implementing design strategies to improve building resilience.

The Institute's report discusses software platforms and parameters relating both to consumption and year by year changes in median energy, water and waste intensity by property type.

Qatar's Ali Bin Hamad al-Attiyah Arena, which can host more than 8,500 people, features a host of design elements to ensure visitor comfort and energy efficiency. The installed solar power of Ali Bin Hamad al-Attiyah Arena covers 700 square meters and generates 45,000 KWh per year. The complex achieved a 4-star rating under the Global Sustainability Assessment System, a green building certification system developed for Gulf Cooperation Council countries.

Some electric car manufacturers and utility providers are successfully testing solutions for smart charging of electric cars. These systems enable buildings and cars in their parking lots to share electrical power, including the vehicle-to-grid (V2G) solution, based on the nature of demand. This breaks the historical mold of passive interaction between buildings and assets such as parking and opens up a Sharing Economy channel that clients of institutions and corporations should focus on when challenging building designers to produce future-ready facilities. Leading questions for the facility's project design should include:

- How future-ready is the electrical design of the building to support electric car charging solutions for parking users, including V2G solutions?
- How future-ready are the building's façade and roof designs? Do they support incremental investment into installing solar panels for localized electricity production and consumption?
- How future-ready is the electrical design of the building to support battery storage of electrical power from renewable energy sources and related building power demand management/optimization?
- How effective are solutions to provide shade for pedestrians, the building's façade or cars, through use of solar panels that also generate power?
- Is the design optimized to allow sun course tracking for some solar panels to deliver solar shading on the exposed façade and roof openings while maximizing solar power generation?

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HBKU RESEARCH COMPLEX
The complex houses the Qatar Environment and Energy Research Institute (QEERI), the Qatar Computing Research Institute (QCRI) and the Qatar Biomedical Research Institute (QBRI). This provides a world class boost to the value-added innovation drive aiming at local and regional economic empowerment.

5.3 Economic Empowerment

> "Qatar aims for a balance between population growth and sustainable development requirements, with the ambition to provide a decent life..."

On a global level, the UN Sustainable Development Goal number 8 aims to "promote inclusive and sustainable economic growth, employment and decent work for all." The United Nations observes that, "Sustainable economic growth will require societies to create the conditions that allow people to have quality jobs that stimulate the economy while not harming the environment."

In some cases, such as calls for diversification and innovation through a focus on value-added, labor-intensive sectors, architecture can be leveraged for delivery of SDG 8 goals in all scales of projects. By mandating their designers to use off-site prefabrication for a majority of components, clients protect their value interests, primarily quality and time, and they support growth and maturation of the value-added and labor-efficient industry.

Clients can also challenge their designers to be programmatically innovative and deliver generationally aware facilities including co-working spaces for home-based businesses **(Ref. 5.3.1)** with short-term low rental rates, which support the emergence of a vibrant entrepreneurial private sector with networking and training hubs for young people, re-skilling centers for the aging workforce and advancement platforms for home-based businesses.

The Silatech annual report 2017-2018 **(Ref. 5.3.2)** demonstrates that it runs many programs in Qatar, in partnership with the Qatar Development Bank, and throughout the Arab world. Architecture and its 21st century integration with IT should allow buildings to interact much more with the surrounding people, via social media apps and Bluetooth beacons for example, to provide information such as employment opportunities. This is a building scale, building block application of one use case, Augmented City, promoted by TASMU **(Ref. 5.3.3)**. The organization calls for facilities delivered locally to leverage architectural integration with IT to support augmented experiences, which are powerful tools for economic empowerment.

With the knowledge that physical learning environments have a considerable effect on education's effectiveness, these efforts include contemporary, effectively designed structures for learning in the 21st century. An organizational focus on continuous training of the workforce is a key retention factor for the new generation of workers. Designers and architects should showcase training zones as active environments allowing different configurations and broadcasting greater awareness to building users that training events are taking place.

Much as young people can be prepared to learn, the country must also retain skilled people inside the nation. Qatar Foundation for example has invested substantially to bring branch campuses of renowned universities to the country and house them in facilities that facilitate learning with modern technology and future-readiness to provide what students and teachers need.

Economic empowerment of young people also requires that corporations and institutions provide environments that attract and retain the new generation of workers. The CAPITA report "Generation Z – Agents of Change. How the workforce's newest entrants can spark business

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SOCIAL DEVELOPMENT CENTER
A vast canopy with culturally-inspired patterns and Islamic references reflects the center's benevolent, holistic vision. Smaller rooms break down the scale of the center; the design also fosters and recognizes that smaller efforts generate the desired bottom-up growth, rather than large-scale, top-down developments.

5.3 Economic Empowerment

transformation" **(Ref. 5.3.4)** finds that "Far from facing an overwhelming resourcing challenge, HR departments are better prepared than they might imagine to assimilate Gen Z into the workforce. In fact, the process of addressing the needs of Gen Z is congruent with the steps many businesses must take to thrive in the modern business world."

Deloitte offers further insights into ongoing demographic and technology-related realities, along with design-based strategies and techniques to address them: "Generation Z enters the workforce -Generational and technological challenges in entry-level jobs" **(Ref. 5.3.5)** and the 2018 Deloitte Millennial survey **(Ref. 5.3.6)**. The Qatar National Master Plan, organised by the Qatar Ministry of Municipality and Environment, acknowledges this thinking. The Qatar National Development Framework 2032 (QNDF 2032) **(Ref. 5.3.7)** document states, "As economic diversification materializes, a move toward high-technology, high value-added industries including information and communication technology, media, education, health and tourism is expected. Significant changes in the demographic and employment composition of the workforce will follow, which will lead to changes in demand for housing, community facilities and transportation services."

The QNDF 2032 also anticipates a shift in employment as construction in Qatar decreases. The document integrates a cautious policy of decline in the number of people employed in building and construction, from 699,429 in 2017 to 250,054 in 2032. It also notes, "Qatar's economic development needs to improve qualitatively through support for high-tech business parks whilst fostering technological advancement and research & development."

Qatar aims for a balance between population growth and sustainable development requirements, with the ambition to "provide a decent life for Qatar's residents, enhance their abilities, broaden their options and raise their participation in the progress and eminence of Qatari society," according to the QNDF 2032.

Qatar's Fourth National Human Development Report **(Ref. 5.3.8)** focuses on understanding the context, challenges and opportunities facing Qatari youth and overcoming obstacles that diminish their contributions to Qatar's knowledge economy.

Qatar Foundation's Social Development Center focuses on educating young people, along with programs for teachers, guardians and parents. There are programs to help young people build good study habits, financial support for students and support for entrepreneurs. Parents, guardians and educators can also take advantage of programs to help them provide guidance to young people.

The following questions can be used by clients and their designers to reflect on their projects' contributions to economic empowerment:

- Which employment sectors of the local economy, especially local manufacturers of building materials and systems, is the project brief especially aiming to support from a procurement standpoint?
- How is the design brief attentive to the needs and expectations of the new workforce generations?
- Are IT-related components of the design brief consistent with initiatives to create smart cities, communities and citizens?
- Does the design brief allow the project to provide the community with public and semi-public spaces that can be used for socio-economic integration between the building and its direct neighborhood?

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OFFICE HUB

The project offers a future-proofed workspace attuned to Generation Z's preferences and fostering multigenerational collaboration. Addressing needs and expectations across age groups, genders and cultures is an important element in the drive to attract, retain and empower the engaged Qatari youth.

EDUCATION CITY CEREMONIAL COURT
This space hosts events such as graduation ceremonies. Its design reflects the nation's reverence for education and respect for future economic contribution of students to the nation's growth. The court faces the international convention center, highlighting the students' mandate to be global citizens.

QATAR SCIENCE & TECHNOLOGY PARK - INCUBATOR
The incubator building is the site where ideas and inventions created at QTSP are transformed into commercially viable plans. The building, a portal to the Park's east entrance, features views of the West Bay central business district, which reinforces the connection between research and business development.

5.4 Innovative Industries & Infrastructure

> “Providing contractors with incentives for inventive proposals creates a virtuous circle by generating greater reliance on these solutions at the design stage of following projects.”

The 21st century theater of operation for corporations and institutions requires innovation – the translation of ideas or inventions into services or goods creating value or incentives that customers will purchase.

In an emergent country striving to establish a knowledge-based economy, every decision can involve the deliberate, replicable and imaginative application of information to deliver greater values from resources. Business innovations result from ideas being applied to satisfy customers’ needs and expectations. In a broader context, realizing that the building design industry is part of the construction industry, itself part of the manufacturing and transformation sector, it is easy to envision benefits that could be on a national level if clients and designers are ambitious.

As one example, pioneering and triggering demand for repeat orders of innovative prefabrication and off-site, mass-customized solutions can foster development of local fabricators to provide solutions. Taking that step reduces reliance on a low-income, imported workforce and imported goods with long lead times while nurturing a start-up community, innovative SMEs and their industrial backbone.

Innovative alliances between suppliers and manufacturers, the drive for impactful projects to pioneer innovations and the power of standardization – applied to building designs – can create a snowball effect that benefits the country when it is promoted at institutional and corporate levels.

The United Nations Sustainable Development Goals noted that “Investments in infrastructure, transport, irrigation, energy and information and communication technology, are crucial to achieving sustainable development and empowering communities.” Qatar’s National Development Strategy acknowledges the needs and challenges of not merely using innovative industries and construction techniques, but fostering a culture that creates them. In its chapter that focuses on sustaining economic prosperity, the document discusses the challenges of private sector development and economic diversification. The report also addresses challenges including the need for developing human capital, rebalancing the labor market’s structure and housing-related needs.

While promoting contemporary technology and innovative integration in design, construction and operations may not be part of an organization’s core focus and featuring their use creates awareness of organizations’ forward-thinking leadership. This orientation also benefits the national industrial and SME ecosystem. Institutions and corporations commissioning medium- to large-scale building projects must exercise their power to develop innovatively, explicitly and with sufficient rewards, which is the approach in Singapore – at the construction-tender evaluation stage. Examples include the use of off-site prefabrication and developments such as corridor multitrade prefabricated MEP racks. These and other options reduce demand for a low-income workforce, increase quality and reliability, reduce lead time and develop the local SME and industrial fabric. Providing contractors with incentives for inventive proposals creates a virtuous circle by generating greater reliance on these solutions at the design stage of subsequent projects.

The Qatar Science and Technology Park (QSTP) Incubator focuses on energy, environment, health sciences and information & communication technologies – much like Qatar’s Development Strategy and the UN Sustainable Development Goals. The Special Zone, an accelerator and incubator, stimulates and expedites the creation of commercially viable technology. Working with the nation’s universities, the QSTP Incubator features private sector partnerships and hands-on work with global industry leaders. The building itself showcases prefabricated steel main structures and mass customization for perforated aluminum cladding panels. Outdoor cooling is provided on the plinth level with a guardrail-integrated chilled water mist solution. This creates a comfortable environment and demonstrates an innovative approach.

WHITE COLLAR HOUSING AT UM ALHOUL SPECIAL ECONOMIC ZONE
The design reflects a new standard for employee residences in an industrial zone. The structures, which provide comfort and natural light in a seaside setting, pay respect to residents who work in the zones, instill pride and help attract skilled people from around the world.

5.5 Economic Inclusion

> "... economic growth is not sufficient to reduce poverty if it is not inclusive and if it does not involve the three dimensions of sustainable development – economic, social and environmental."

The United Nations Sustainable Development Goals call for reducing inequality within and among countries. The UN relates that while significant numbers of people have emerged from poverty, "inequality still persists and large disparities remain in access to health and education services and other assets." There is a growing consensus, the UN adds, "that economic growth is not sufficient to reduce poverty if it is not inclusive and if it does not involve the three dimensions of sustainable development – economic, social and environmental."

The UNESCO publication "Creating Inclusive and Equitable Cities" refers to UN Habitat III and its related UN New Urban Agenda by stating "A key focus of Habitat III and the New Urban Agenda is equity and social inclusion. By ensuring equity in opportunities and services, as well as fair distribution of society's benefits and burdens, states and local actors advance social and urban development in line with human rights, and give individuals the chance to live to their full potential" **(Ref. 5.5.1)**.

Growth is often fueled not just by urban success, but "on the economic relationship between urban and rural areas," according to Christiana McFarland, director of research at the U.S.-based National League of Cities. She notes that economic bases in rural areas will often "extend value chains and markets into urban areas" **(Ref. 5.5.2)**.

In Qatar, the second National Development Strategy devotes major sections to promoting human development and sound social development. It also notes the challenges of rebalancing the structure of the labor market. The document addresses education-related challenges across all residents of the country, regardless of nationality and income.

Plans for moving Qatar forward, with smart cities and further development of the knowledge-based economy, are addressing the economic divide which exists among the country's citizens, along with broader divides among expatriate workers. These plans, which more broadly cover master plans and project-level execution, aim to deliver affordable solutions to address the diverse range of issues that contribute to and emerge from economic divides.

Key issues include:

- Challenges to ensure that citizens of all nationalities have opportunities and respect, regardless of their social status and ambitions.
- Global calls to extend care and compassion to the least fortunate among us, locally and otherwise.
- Needs for thoughtful planning and conversations, not just among clients and their architects, but with the people whose needs and desires are served by the projects.

Addressing income inequality, national and international goals and requirements – along with cultural and environmental realities – frame a number of critical questions that clients and architects should consider when developing their projects:

- Which are the five most important points the architect must focus on when referring to the UN New Urban Agenda's section:
  – The Quito implementation plan for the New Urban Agenda.

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MINARETEIN
The Mosque's outdoor elevated prayer ground is turned towards a heritage building, demonstrating commitment to sustainable leveraging of cultural heritage, both tangible and intangible. This recognizes tradition and history and the role it plays in strengthening social participation.

5.5 Economic Inclusion

-Transformative commitments for sustainable urban development. -Sustainable urban development for social inclusion and ending poverty – points 25 through 62 **(Ref. 5.5.3)**.

- How should the design reflect an inviting, encouraging awareness of potential users' needs, whether the project is likely to be used by a diverse group of people or otherwise?
- How should the design reflect awareness of and appreciation for different individuals' levels of education and income?
- How should the design fit in with and reflect consideration for any nearby heritage structures and practices?
- How does the project help bridge the gap – in terms of facilitation of urban mobility – between opportunity and access? **(Ref. 5.5.4)**.

The Mosque at the Qatar Faculty for Islamic Studies, based on pillars of faith in the most literal sense, reinterprets the traditional in modern ways. The structure draws together and inspires people in an environment of respect and compassion. The Mosque is supported by five large columns representing the five pillars of Islam, with each featuring a verse from the Holy Qur'an. Prayer lines are extended to the building's exterior landscape, reflecting that the entire earth is a ground for prayer. The Prayer Hall and other zones of the building also feature symbolic and poetic references to Islam and its civilization:

- The inviting openness of the Mosque to the Al Rayyan community – beyond Education City users – promotes social cohesion, equality and inclusion.
- The strategic location of the Mosque and its outdoor elevated prayer ground demonstrates Qatar Foundation's commitment to promoting culture and respect for diversity and equality as key elements in the humanization of Education City.
- The Mosque's elevated ground and the interconnection of the building with the adjacent Oxygen Park and Education City tram stop provide shaded and water feature-animated multifunctional areas for social interaction and inclusion, health and well-being, cultural expression and dialogue among people of varying ages and cultures.
- The expressed volume of the Mosque and its outdoor elevated prayer ground are turned towards a heritage building to witness the area's brownfield history, demonstrating commitment to sustainable leveraging of cultural heritage, both tangible and intangible. This recognizes tradition and history and the role it plays in strengthening social participation.

In tending to the physical needs of medium and low-income expatriates in Qatar, the workers' housing project in Umm Alhoul (Qatar Economic Zone 3) shows it is economically realistic to design and construct good, safe housing for everyone, which is essential for those who seek to improve their education, employment and income. Thoughtful elements that make the residences considerably more livable include: large balconies providing views and private space for fresh air, ground-level floors designed to be used for retail stores or to serve community needs through hosting facilities such as nurseries. The design guidelines of this project mandate, "The architecture of buildings for all residential users should be focused on a safe, enjoyable and comfortable living environment with the necessary access to amenities and services."

Architectural vocabulary construction methods and materials are oriented toward being simple, functional, durable and easily maintained, providing people with respectable dwellings in which they can live their lives with dignity.

Architects across the world have demonstrated that it is possible to create workers' housing that can be upgraded to social housing, which is owned and adapted to personal tastes – by relatively low-income expatriates. In the case of Qatar, this is oriented toward expatriates who are more permanently settled than shorter-term construction workers. People can upgrade their living environments without moving, eventually own their homes, improve their finances and become an established part of neighborhood and broader communities. This approach, incremental housing, deserves consideration in the GCC as a sustainable approach that helps bridge the economic divide and

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DATA CENTER M-VAULT 2
In 2016, the United Nations declared, in an addition to Article 19 of the Universal Declaration of Human Rights, that internet access is a human right. A carrier-neutral Tier III data center (99.98 guaranteed availability) like M-Vault 2 is an acknowledgement that ensuring internet access is essential for economic Inclusion.

5.5 Economic Inclusion

caters for market shifts between categories of workers required by changes within national economies.

The siting of the white-collar housing of Um Alhoul Special Economic Zone along a sea-facing commercial promenade and the siting of its blue-collar housing next to a green park and within easy reach of a metro station demonstrate the project's commitment to:

- Creating safe, inclusive, accessible, green and high-quality public spaces as drivers of social and economic development, to sustainably leverage their potential to generate increased social and economic value, including property value, and to facilitate public and private investments and livelihood opportunities for all.
- Providing the labor force with access to income-earning opportunities, knowledge, skills and educational facilities that contribute to an innovative and competitive urban economy.
- Stimulating the supply of diverse housing options that are safe, affordable and accessible for people across a wide range of income levels, taking into consideration the socioeconomic and cultural integration of communities and preventing segregation.
- Developing a vibrant, sustainable and inclusive urban economy, building on inherent potential, competitive advantages as well as resource-efficient and resilient infrastructure.
- Promoting sustainable and inclusive industrial development that fosters an enabling environment for businesses, innovation and personal livelihoods.

QATAR NATIONAL CONVENTION CENTRE
Built to host international events, the complex has established Qatar as a regional and global destination for multinational dialogues and important events such as trade negotiations. The complex also hosts a number of professional conferences that connect Qatar and its people to the world.

5.6 Partnerships & Synergies

> “Encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships.”

The UN Sustainable Development Goal 17, “Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development,” recognizes multi-stakeholder partnerships as important for sharing knowledge, expertise, technology and financial resources to support the achievement of sustainable development goals in all countries, particularly developing countries.

Addressing systemic issues, the report’s targets call on public- and private sector organizations to “Encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships.”

Bringing a facility or building from vision into operation requires partnerships and synergies of clients, building designers and contractors. These interactions can have ripple effects on economic and social systems through development and dissemination of knowledge.

Too many partnerships, though, have been entered into on the basis that collaboration is a Good Thing, with insufficient attention paid to essential questions:

1. What is the power of partnership as a mechanism in terms of the intrinsic added value it brings toward delivering on an SDG?
2. How will each individual partner gain net value from participation? **(Ref.5.6.1)**

The architectural process requires the pooling of the resources of institutions’ and corporations’ executives, building designers and contractors to enhance the impact and power of projects. To achieve this lasting, significant effect, organizations must commit from the first step, the strategic design briefing stage, to identify the following:

- How can the building project contribute to another partner in terms of leverage or exchange? For example, can the building provide an opportunity for an urban passage or an amenity accessible by the public that is needed by the adjacent community?
- Which partners can be selected for integration of delivery resources? For example, can many of the urban mobility needs of a building’s users be provided by car sharing or ride-hailing solutions rather than resorting by default to mass parking for the conventional car owning approach?
- Which people and organizations, traditional and otherwise, can contribute to envisioning, briefing, designing and building in ways that transform key internal and external processes? For example, can university researchers and start-ups work with established building design and construction agents to participate in defining and optimizing issues and solutions?

In these years of urgent need to contribute meaningfully to the planet, a strategic and tactical deep reflection into which agents of the local, regional and international community can be invited to contribute is key, even at the scale of one building at a time. Each building can be the agent of incremental yet critical contributions to policies and initiatives promoted by a country.

An attention to soft power **(Ref.5.6.2)** created and used by the country that hosts the institution or corporation that is creating a facility or building – is instrumental to the productivity of partnerships and

References

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THINKBAY
THINKBAY, known for several years as the Strategic Studies Centre and used by stakeholders of RAND, a non-profit, policy research organization, is home to researchers who conduct a wide range of on-demand studies to provide insights and guidance to the Qatar Foundation and its partners.

5.6 Partnerships & Synergies

synergies. Clients should acknowledge the capacity to participate in soft power narratives of the host country or city **(Ref.5.6.3)**.

Participation does not necessarily require an iconic structure, but rather an engagement of communities in the briefing, design, construction and operation processes at a deeper, more diverse and more meaningful level.

The design of Qatar's National Convention Center addresses these ambitions through hosting a variety of meetings, conferences, professional functions and cultural performances such as plays and concerts. The center, which opened in 2011, includes a 4,000-seat conference hall, a 2,300-seat theater and other event spaces including 52 meeting rooms.

The building was designed to reference the Sidrat al-Muntaha, a holy Islamic tree and the logo symbol of the institution, which commissioned the building. The design also connects the local culture's earliest elements with modern needs and technology. More than 12 percent of the building's energy comes from 3,500 square meters of solar panels strategically located at the edge of the roof so the sustainability element is easily seen from a nearby avenue. The artful, imaginative and effective building is a place where people of all nationalities and backgrounds come together to work, learn and enjoy experiences.

In serving as a site for major conferences, seminars and meetings, the QNCC also draws together several threads of the nation's latest National Development Strategy. The document, released in March 2018, calls for the promotion of human development amid challenges including the need to establish and maintain global partnerships for development.

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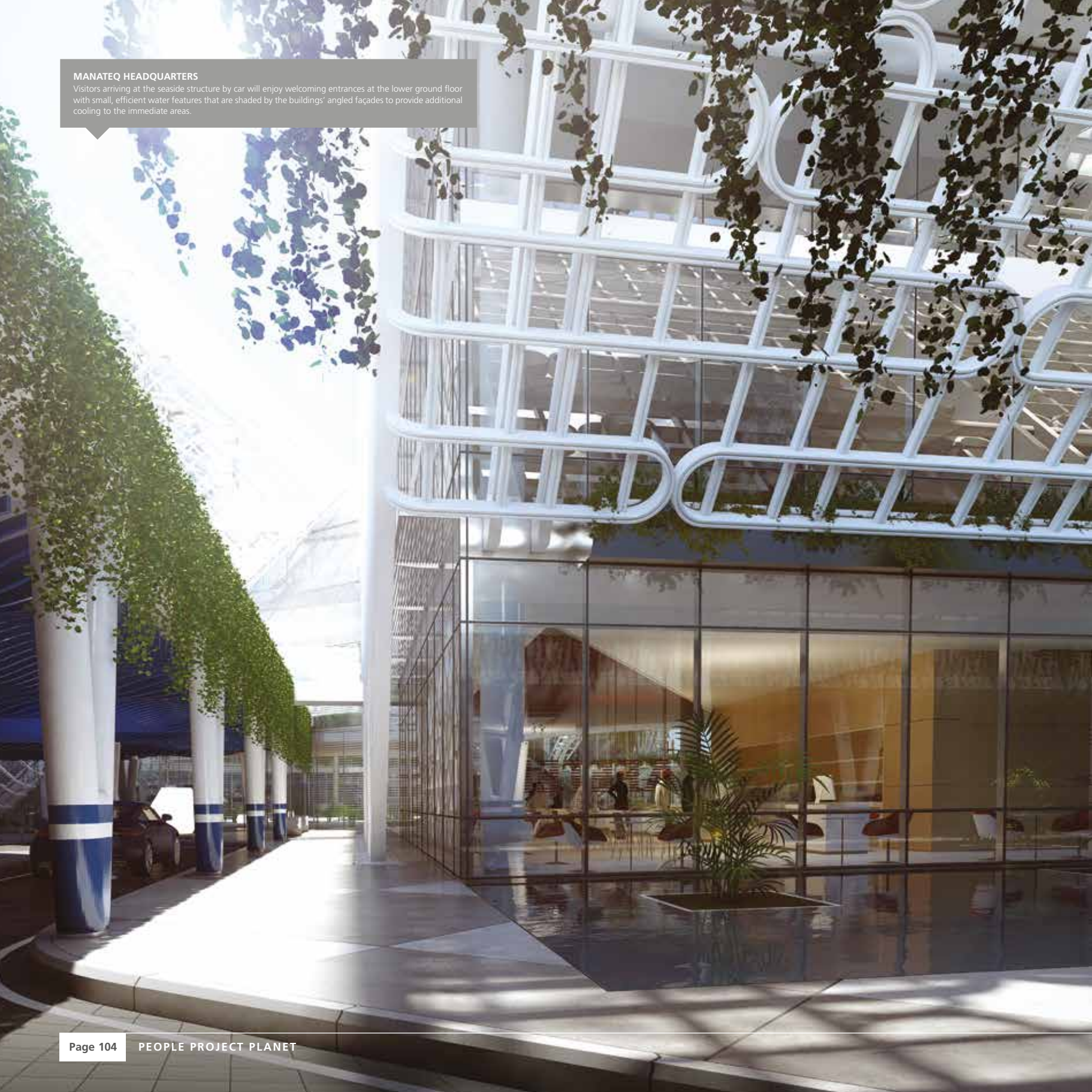
6. Planet



MANATEQ HEADQUARTERS
Visitors arriving at the seaside structure by car will enjoy welcoming entrances at the lower ground floor with small, efficient water features that are shaded by the buildings' angled façades to provide additional cooling to the immediate areas.

6.1 Clean Water

> “Qatar’s hot and humid climate allows the collection of water condensate from air conditioning units more than 140 days a year.”

While we live in a world of ever-new technology and fast-paced construction, one of our largest challenges remains one of the oldest: the need for clean water.

In a world where UN studies show that water usage grows twice as fast as the population and in Qatar which has the world’s largest water reservoir, but only four days of water reserves, it is obvious that water is a precious asset. The financial effect is vast: in Qatar, desalinated water is subsidized between 30 to 55 percent, depending on the customer type. There is an imperative for institutions and corporations to focus on using water responsibly.

Desalination is a solution that is not without concerns; it is costly and consumes a considerable amount of energy. The process also returns extremely salty water, brine, to the sea, making the heavily salted water that much saltier. Any success in water preservation brings multiple benefits – including cost-savings – that must be highly valued in any return-on-investment study.

There are proven, cost-effective means of addressing this challenge. On average, Qatar’s hot and humid climate allows the collection of water condensate from air conditioning units more than 140 days a year. The significant amount of water recovered with that simple solution (2.5 million liters of recovered water a year for a university faculty building of 32,000 square meters with 600 tons of cooling power) provides clean water that is usable for softscape irrigation, water features or graywater sanitary systems **(Ref.6.1.1)**.

In this environment, public and private sector developments should go back to sound, traditional solutions regarding fountains and other water features, which lose water to evaporation. Planners should ensure these features are located in areas that allow immediate pedestrian and public use with cooler, shaded, slow-paced and comfortable microclimates. Use of water features mainly for prestige or decorative reasons does not send a productive message about responsible water use.

Used wisely, though, water features make environments more comfortable while reminding people that water is a precious resource.

Manateq’s headquarters effectively uses water features that provide cooling microclimates for people entering and leaving the buildings. The placement of the water feature at the lower ground floor, in the shade of the slanted building envelope, provides cooling and microclimates next to the entrances. This 18,000-square meter building in Ras Bufontas (Special Economic Zone) blends traditional and contemporary architecture that also contributes to the building’s sustainability. Much of the headquarters’ interior space provides views of the adjacent Arabian Gulf, which reaffirms the connection to water and aquatic life, along with the need to treat them with respect. The site is further connected to the aquatic environment by a seafront promenade created along a sea mangrove cconservation and restoration zone.

Qatar’s National Museum features a salt water man-made lagoon that meets the museum with edges shaped like the nation’s mid-20th-century coastline at this location. The lagoon’s water is taken directly from the adjacent Arabian Sea. An attractive and imaginative part of the complex with its own microclimate, the lagoon reminds visitors of the challenges of life on the shore of the nation.

References

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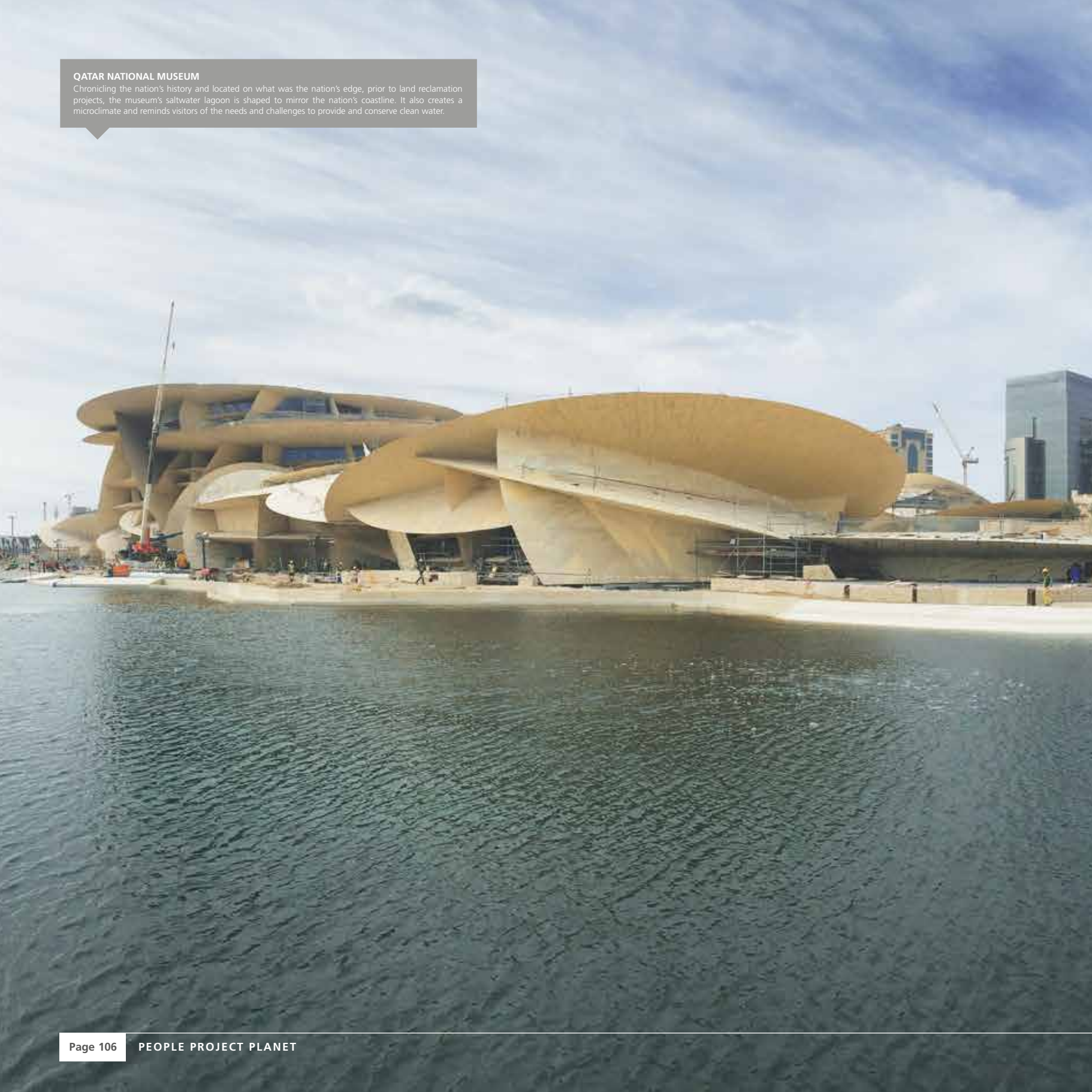
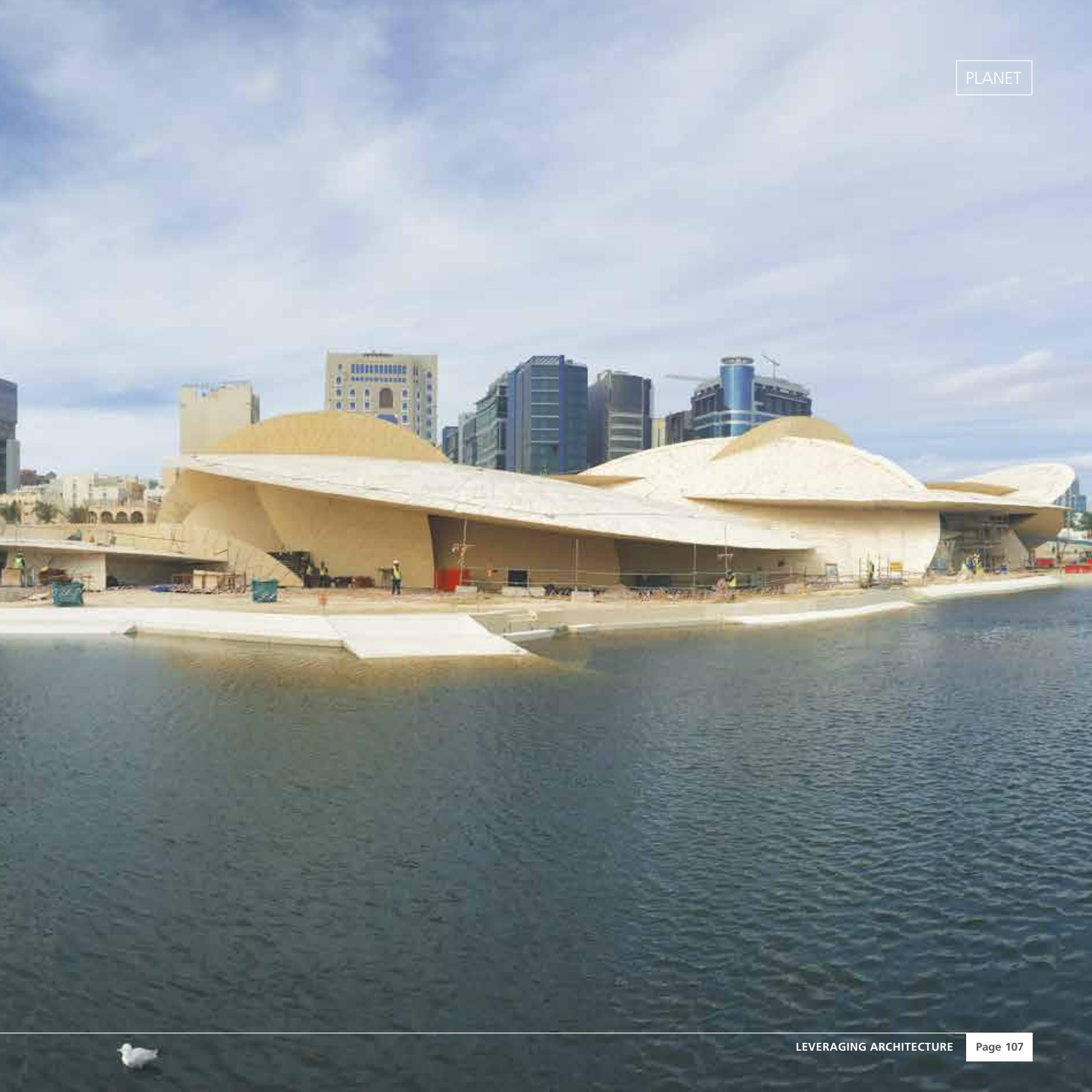


QATAR NATIONAL MUSEUM
Chronicling the nation's history and located on what was the nation's edge, prior to land reclamation projects, the museum's saltwater lagoon is shaped to mirror the nation's coastline. It also creates a microclimate and reminds visitors of the needs and challenges to provide and conserve clean water.



QATAR UNIVERSITY SPORTS & EVENTS COMPLEX
Located in the nation's first university, the complex was built with a focus on responsible consumption of materials and land. Featuring movable seats and flooring, the structure can be reconfigured to serve as a sports venue and a site for events such as graduation ceremonies.

6.2 Responsible Consumption

> "The circular economy concept was developed in the late-70s to address the challenge of creating new jobs and opportunities along with responsible consumption and production patterns."

Responsible development requires the gradual uncoupling of economic growth from new extraction or consumption of finite natural resources. Global figures, however, reveal worsening trends from 2000 to 2010. Domestic material consumption, the amount of natural resources used in economic processes, increased from 1.2 kg to 1.3 kg per unit of GDP. Total domestic material consumption grew from around 49 billion tons to 71 billion tons **(Ref. 6.2.1)**.

Responsible consumption and production patterns are of course strongly linked to several other Sustainable Development Goals such as reducing hunger, combating climate change, reducing water use and providing universal access to affordable energy.

The circular economy concept was developed in the late-70s to address the challenge of creating new jobs and opportunities along with responsible consumption and production patterns. In recent years, the concept has been revised by studies from the UN and the Ellen MacArthur Foundation.

The challenge is to do more and better with less by steering economic and social systems for responsible production and consumption patterns away from a linear approach. This orientation promotes resource and energy efficiency, reducing food waste throughout the supply chain, building sustainable infrastructures, providing access to basic services and creating sustainable jobs.

A circular economy requires proactive collaboration between stakeholders across products' lifecycles, and consideration of business goals along the value chain. It is essential to engage stakeholders, producers, manufacturers, intermediaries, merchants and consumers in order to achieve the best value for all parties.

An Ecomena publication **(Ref. 6.2.2)** states: "Research has shown that a circular economy development path can have substantial additional economic benefits for emerging economies, and furthermore reduces negative externalities.

"Moreover, the relative scarcity of resources other than oil and gas in the Gulf states would provide an incentive to embark on a path towards a more circular economy. The concept has the potential to lead to reduced waste production, less dependence on imports of raw critical materials; more employment opportunities as well as decreased environmental impacts."

In 2018, the publication noted that Qatar had strong momentum for economic diversification, foreign ownership and investment facilitation, visa relaxation, business friendliness, self-sufficiency and resilience. All of these factors have created a perfect storm moment for corporations and institutions to establish the industry and market ecosystem to grow the circular economy.

Globally, there is considerable room for improvement within the Engineering and Construction industry; it is the largest consumer of raw materials, accounting for 50 percent of steel production and consuming more than 3 billion tons of raw materials **(Ref. 6.2.3)**.

References

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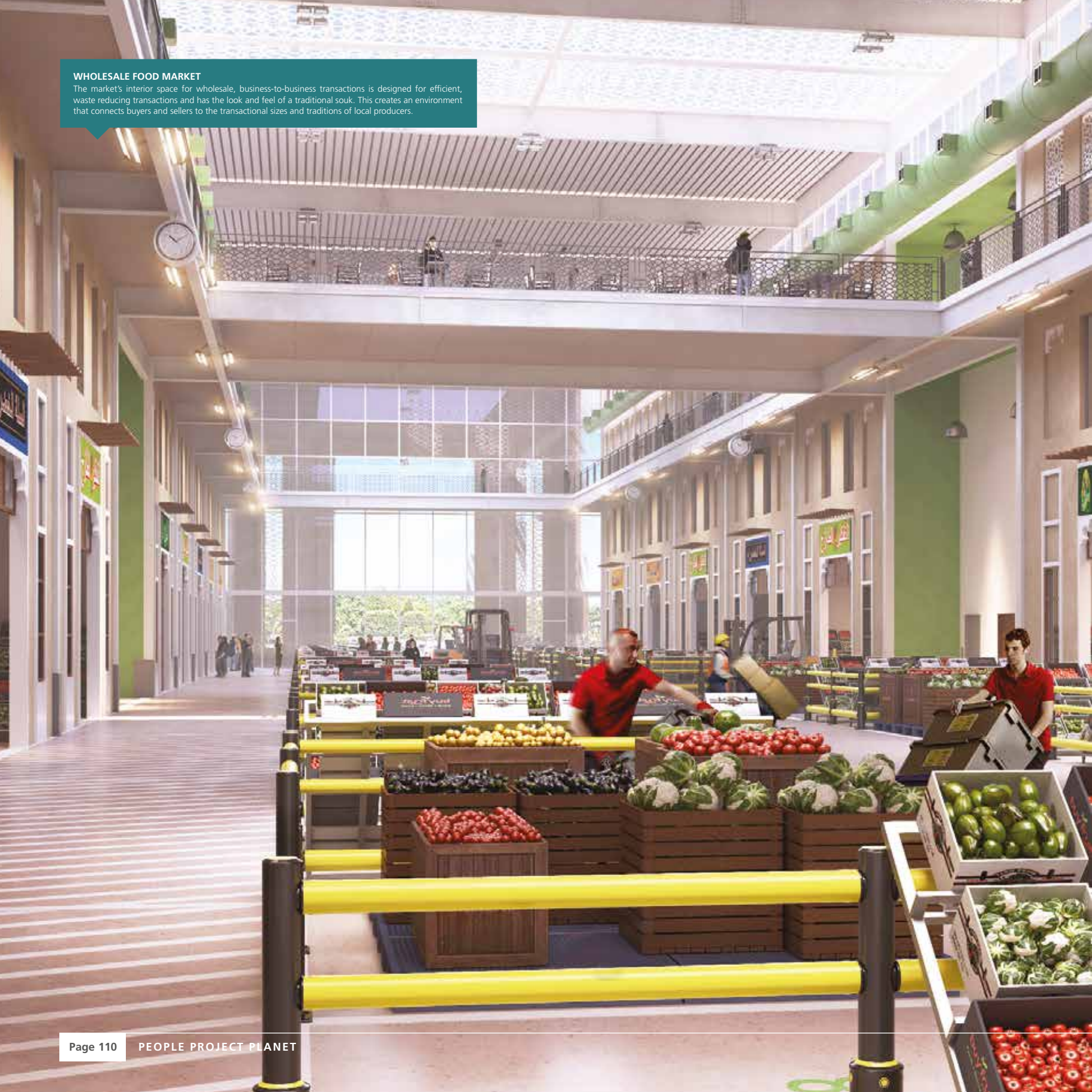

WHOLESALE FOOD MARKET
The market's interior space for wholesale, business-to-business transactions is designed for efficient, waste reducing transactions and has the look and feel of a traditional souk. This creates an environment that connects buyers and sellers to the transactional sizes and traditions of local producers.

6.2 Responsible Consumption

The ReSOLVE framework is a key output of the Ellen MacArthur Foundation's research on the circular economy. It outlines six actions to guide the transition:

- Regenerate
- Share
- Optimize
- Loop
- Virtualize
- Exchange

The six elements can be applied to products, buildings, neighborhoods, cities, regions, or entire economies **(Ref. 6.2.4)**.

The first step is a corporation or institution requesting or agreeing that its building designer identify ReSOLVE opportunities for circular economy intervention in the layers of its projects **(Ref. 6.2.5)**:

- System
- Site
- Skin
- Structure
- Services
- Stuff

Once that commitment is made, the team can move forward to:

- Design out waste from the inception of the project.
- Design for resource efficiency and material use optimization.
- Design for easy dismantling.
- Ensure responsible sourcing of materials, including eliminating hazardous substances, and increasing recycled content.
- Use delivery and return logistics options with material vendors.
- Use product-as-service systems rather than outright purchase.
- Use vendors' incentivized return options.

Any medium- to large-scale building project is an opportunity to help the built environment sector develop and benefit from the circular economy by ensuring the project's design and construction are structured around explicit answers to the following questions:

Case Studies and Benchmarks

- How is the project allowing co-development and collaboration with locally available applied research bodies to challenge the industry to follow circular economy principles?
- How are the circular approaches proposed in the design or procurement relevantly benchmarked to specific case studies?

Innovate

- How is the construction tender process incentivizing and rewarding bidding contractors to implement industry innovation relevant to the specific projects' big-ticket items?
- How are the projects' technical specifications, design provisions and embedded potential options proposing practical pilots to enhance knowledge and skills, build capacity and drive innovation in the built environment?

Circular economy vision and business models

- How is the design brief aligned with the client (corporation or institution) in explicitly defining effective circular economy design frameworks and principles aligned with a vision and roadmap related to the client's market sector and national development strategy?
- How are key assumptions of service provisions, mobility or operations relevant to the design parameters of a project developed according to radical, potentially disruptive business models and services?

References

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WHOLESALE FOOD MARKET

Regionally, upwards of 30 percent of produce is lost to logistical inefficiencies, a problem that is addressed by several design elements in the complex. The market includes easy entry and departure for trucks, parking for vehicles of all sizes, ample refrigeration and shaded sales areas.


محلات الجملة للحوم والدواجن

WHOLESALE & CENTRAL FOOD MARKET

The aerial view shows that attention to details, within the complex and with regard to access points, ensures that food deliveries and customers' arrivals and departures are efficient, which ensures the cold chains are maintained and promotes responsible consumption via reduced waste and transportation delays.

WHOLESALE FOOD MARKET
Public mobility inside the mega site is facilitated by a fleet of driverless electric shuttles. These robotaxi vehicles benefit from charging stations with photovoltaic panels doubling as shading for car parking spaces. The responsible consumption message is embedded in the user's daily experience.

6.2 Responsible Consumption

Reuse and remanufacture, design for disassembly.

- How are building components selected by the building designer in alignment with a client-approved vendor list, which looks at design and construction lead time against the scheduled start of operations of locally developed factories and assembly lines implementing new business models including but not limited to off-site prefabrication and plug-and-play components in the built environment supply and value chains?

Multi-stakeholders' collaboration

- How does the project design stage initiate early collaborative activities such as industry and client workshops to help identify joint challenges, complementary expertise and opportunities for strategic partnerships?
- How does the project construction tender stage initiate early collaborative activities such as pre-construction conferences to help identify joint challenges, complementary expertise and specification, and supply chain alternatives for strategic partnerships?
- How is the project's potential reach beyond the direct market sector of its end-users practically leveraged so opportunities for innovative pilot and demonstration projects (geared towards responsible consumption and production) for other market sectors are embedded in the project at an early stage?

Training and awareness

- How is the project design stage used at the client and building designer levels to provide a forum for training programs on the circular economy to raise awareness across all grades and disciplines, and initiate targeted training sessions for leaders, project managers and specific disciplines?
- How are the project operator and end-user developing a public communication plan and tools regarding the circular economy to raise awareness across users and visitors?

Food waste mitigation

Due to the project's primary function, food distribution, the challenge of food waste had to be addressed. Thirty percent of world food production is lost to problems such as inefficient harvests, poor storage and ineffective supply chains.

The SDG target is: "By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses."

When food is lost to waste, so is water, fertilizer, packaging, transportation capacity and land use. Consider that agriculture is the biggest user of water worldwide and that irrigation consumes 70 percent of all freshwater for human use.

More food waste creates less food security, as well, which is a major challenge for nations moving toward increased domestic food production.

Qatar's need for effective food production planning has been a matter of focus for more than a decade. The Qatar National Food Security Program was established in 2008 to reduce the country's reliance on food imports. Efforts to expand the agricultural sector focus on introducing best practices and optimal use of scarce resources with profitability, sustainability and limited environmental impacts.

The Doha-based National Research Fund has found that in emergent countries such as Qatar, 37 percent of food waste is related to handling and storage.

The Wholesale and Central (and Livestock) Food Market project designed by ASTAD – at the request of one ministry – brought the opportunity for the design team to address responsible consumption and production directly at two different market sector levels.

Issues such as cold chain interruptions, inefficient logistic chains and poor handling of goods are documented problems that ASTAD's design team addressed in designing the food market complex.

It developed solutions such as shared logistic docking bays, central logistic alleys and tenants' units allowing standardized and optimized storage and easy customization of climate control requirements.

Waste recovery is also handled with state-of-the-art compactors and bioreactors that produce fertilizer for the site's landscaping.

The building's space usage is also optimized by using standard-sized Euro pallets, which will trigger a nationwide program of standardized

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CENTRAL FOOD MARKET
Business-to-consumer transactions are organised around human scale modular kiosks designed to mitigate the risk of food waste at the stall and food over-consumption by providing optimised exhibition compartments whilst allowing localised climate control.

6.2 Responsible Consumption

packaging and palleting, ensuring food is packed, stored and transported efficiently.

- The wholesale food halls are designed using lessons learned for responsible production and logistics from produce markets in cities such as Toronto, San Francisco, San Antonio and Seoul.
- Giant skylights above the central streets of the wholesale halls and at the edge of the main hall of the central Market use mega-ETFE cushions.
- Multi-services prefabricated corridor racks are proposed for the building services of the wholesale hall tenants' offices.
- The main hall of the central market relies on an array of prefabricated AHU rooms providing decentralized cooling and recovering the condensate.
- Public mobility inside the site is facilitated by the use of third-party autonomous electrical shuttles hailed on demand through a smartphone app. Street and parking lot lighting relies on solar battery-powered systems.
- The design focuses on pre-engineered, easily demountable steel-based structural frames with demountable screw and bolted sandwich-insulated panels closing the walls and roofs, and a locally sourced GRC decorative skin.

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MINISTRY OF EDUCATION AND HIGHER EDUCATION HEADQUARTERS
The masharabiyah screen projected in front of the exterior building envelope performs a heat mitigation role that has not been integrated in the façade heat gain calculations. This allows the air conditioning system to have a resilient buffer capacity against expected temperature rises created by climate change.

6.3 Climate Resiliency

> “Many climate-smart investments can also reduce air pollution and congestion. Building resilience now saves money later. We are committed to supporting a climate-smart future.”

The New Development Bank captures the strategic nature of climate change when it declares: “Partnership around the world must be maintained in the global effort to achieve a smooth transition to low carbon and climate-smart development. Multilateral development institutions have never been more relevant. Climate-smart development also makes good economic and business sense, particularly when it comes to sustainable infrastructure. We have already witnessed tremendous growth in renewable energy, creating with it new business opportunities and jobs. Many climate-smart investments can also reduce air pollution and congestion. Building resilience now saves money later. We are committed to supporting a climate-smart future” **(Ref. 6.3.1)**.

Critical as they are, climate change scenarios often bring paradoxical issues to locations like Qatar. As an example, climate change is likely to bring more peak rain to Qatar. When following the likely AR4 and A2 categories of emission scenarios (SRES) specified by a former Intergovernmental Panel on Climate Change report, a study specific to Qatar predicts significant peak rainfall increases in the last quarter of the 21st century. The increase in 24-hour annual maximum rainfall for this period is found to be in the range of 68 percent to 76 percent for the 100-year ARI (average rain intensity). For the typical design ARI’s of 10 to 20 years, the increase in rainfall ranges between 43 percent to and 54 percent. This – if managed effectively – could prove beneficial for Qatar and other countries that now receive very little rain. One problem is that new infrastructure and buildings, some of which will be operational at the end of this century, are absolutely not designed to deal with these intensities. More landscaped roofs slowing down peak rain flows, more infiltration soakaway and more floodable wadi landscaped solutions should be implemented to prevent heavier rain from overtaking stressed drainage infrastructure **(Ref. 6.3.2)**.

Another study shows that likely climate change scenarios include an increase in the number of days with high humidity, which could be turned into a positive development if building designers use air-handling units and condensate recovery solutions to convert this humidity into clean, reusable water. One problem, though, is that high humidity also renders building envelope airtightness even more critical to prevent problems such as energy waste and sick building syndrome. Incidentally, building envelope airtightness performance is a very common weak spot, which does not receive enough practical attention and investment at the design and commissioning stage.

Another climate change study indicates **(Ref. 6.3.3)** that parts of the Middle East may exceed the 35C threshold “wet-bulb” temperature, the threshold of human tolerance – even for fit and healthy people – once every 10 to 20 years by the end of the century. In the Middle East, wet-bulb temperatures have already reached 31C, but 35C has not been recorded anywhere on Earth, yet. This impact could render whole cities unsustainable since it would eliminate outdoor activities

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MINISTRY OF EDUCATION AND HIGHER EDUCATION HEADQUARTERS
Climate change in Qatar is expected to generate considerable peak rain increases, which creates a greater need for effective drainage. The perimeter of each building is protected against flooding by oversized trench drains concealed under decorative gravel beds.

6.3 Climate Resiliency

hence the need to collaborate - through sustained local actions - with international efforts for climate change mitigation and adaptation. **(Ref. 6.3.4 / Ref. 6.3.5)**

While greater heat, rain and humidity pose life-threatening challenges, it is anticipated that sea level rise associated with climate change will prove particularly damaging to coastal developments and reach deep into the territory, given the flat topography. Studies forecast a gradual sea level rise of up to 100 cm for Doha by end of 2100. With that perspective, adherence to available Coastal Zoning Management Plan requirements should be mandatory.

The view is clear: Qatar is "highly vulnerable" to the adverse effects of climate change, according to the country's General Secretariat for Development Planning.

"Development will be carried out with responsibility and respect, balancing the needs of economic growth and social development with the conditions for environmental protection," the country's National Vision 2030 states. The Secretariat notes that Qatar faces "extreme vulnerability" to rising sea levels and flooding. "Due to the shallow depths of Qatar's marine waters, even small rises in temperature will have a profound influence."

Qatar's National Vision 2030 calls for "management of the environment such that there is harmony between economic growth, social development and environmental protection." That view is widespread across the country's directives. Qatar's Environment Plan calls for "new commitments to long-term environmental management, systematic changes to meet specific targets for conservation and appealing to societal values to invest in the environment for future generations. The Vision also acknowledges that "the hydrocarbon industry, which is responsible for Qatar's strong economic position, puts the government in a position to make the large investments required to meet ambitious environmental targets."

Official concerns are backed up by research projects, which have found that about 75 percent of buildings and infrastructure in the region face risks of sea level rises, hotter weather and storm surges related to climate change. The public sector's push to accomplish various goals, with an innovation-driven approach, can foster – or require – construction efforts and broader planning to address concerns and realities. Corporations and institutions, which are creating any number of medium-sized and major projects, must be awakened and consider climate change risk as part of their business practices. The required climate-smart investments and use of resilient design strategies, to include climate change mitigation and reduction, should be top-down, with firm instructions and requirements provided to building designers.

Substantial as the threats are, designers have simple, effective solutions to some climate-related threats. Some student housing in Education City features floodable swales, channels that direct rainwater to locations where it can be absorbed into the ground, rather than into a contained drainage system.

While it is essential to consider specific techniques and tools, we must do so as part of a focus on the broader reality: we are creating buildings and infrastructure which are required to be operational up until the last quarter of this century. The time to adopt climate change mitigation and adaptation action is now.

For Middle East projects, building designers must carefully look at design - buildings being blocks of city design - in relation to the negative effects of climate change on countries with arid climates. For hot and dry or hot and humid locations the design briefs can be guided by publications such as the ARUP report "Rethinking Cities In Arid Environments"**(Ref. 6.3.6)**.

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CORPORATE HEADQUARTERS
The building is moored at the end of a commercial boulevard and provides a public pedestrian gateway to the sea. The surrounding mineral plaza fades into a sea mangrove protection and restoration area which offers great real estate value for all the adjacent developments.

6.4 Water Respect

> "Building projects themselves must be planned and executed with respect for water, in the course of design, construction and long-term operation."

The United Nations reminds us **(Ref. 6.4.1)** that bodies of water "drive global systems that make Earth habitable for humankind. How we manage this vital resource and how we counterbalance the effects of climate change is essential for humanity as a whole." Living in a coastal nation, people at all levels of life in Qatar know well of the water's bounties and need for its care. Globally, "Over three billion people depend on marine and coastal biodiversity for their livelihoods," according to the UN. "However, today we are seeing 30 percent of the world's fish stocks overexploited, reaching below the level at which they can create sustainable yields."

Beyond the obvious benefits we get from water and aquatic life, which affect our lives every day, there are profound benefits we do not see. The UN also points out that oceans "absorb about 30 percent of the carbon dioxide produced by humans and we are seeing a 26 percent rise in ocean acidification since the industrial revolution."

Growth in desalination, along with rapid population growth in Qatar, places the Arabian Gulf under increasing strain. Economic growth aspirations and calls for healthy eating can have the undesirable effect of threatening fish stocks and disrupting food chains. Water pollution just in the form of plastic is reaching "alarming levels," the UN has said, "with an average of 13,000 pieces of plastic letter to be found in every square kilometer of ocean."

To address these and other concerns, the UN's goals include:

- By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution.
- By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans.
- By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans.
- By 2020, conserve at least 10 percent of coastal and marine areas, consistent with national and international law.

In Qatar, the second National Development Strategy (NDS-2), which was published in March 2018, makes it clear that respect and care for water is a top priority. The document relates that efficient use of natural resources, including oil, energy and water is the number one success factor. It also recognizes that what it calls an unbalanced population concentration has added pressure on the infrastructure, including water-related matters. Considerable population growth, approximately 10 percent per year since 2004, has added to the demands for water and need for sound planning because it "inevitably puts pressure on natural resources, especially fresh water," the report says. "It also does require greater efforts in water treatment and reuse."

Addressing treated sewage effluent (TSE), the NDS-2 calls for expansion of its use in Qatar "and the development of water management in industrial zones, with enhanced efficiency and proper management of water use, which would promote and activate private sector participation in supporting water sector projects." The document calls for provision of infrastructure to use 70 percent of the TSE.

Qatar's NDS-2 also recognizes that the country's water resources are particularly important, given the lack of fresh water bodies and low rainfall. "There are only three water resources: desalinated water,

References

Ref.6.4.1: UNDP (2018), Goal 14: Life Below Water.
Retrieved from: http://www.undp.org/content/undp/en/home/sustainable-development-goals/goal-14-life-below-water.html

Cont'd.

SEALIGHTS ISLAND
The proposed complex 300 meters off the coastline includes an aquarium and a center to study the region's fragile sea life, which includes dugongs and whale sharks. The buildings celebrate these functions by immersing visitors into different manifestations of water and aquatic environments.

6.4 Water Respect

groundwater and recycled water; all are inefficient, much as they are critical to water security." In the country, desalinated water production totaled 533 million cubic meters in 2015, compared to 362 million cubic meters in 2010.

Qatar's Natural Resources Management (NRM) strategy focuses on conserving, sustaining and diversifying water resources, including desalinated water, groundwater, and recycled water, "which could be achieved by reducing desalination costs and all kinds of water loss, enforcing the conservation law, launching awareness campaigns and increasingly using TSE," according to the NDS-2. "The NRM strategy also focuses on a sophisticated plant, animal and fishery production system that promotes self-sufficiency and food security through the use of modern technologies."

Building projects themselves must be planned and executed with respect for water, in the course of design, construction and long-term operation. Systems and procedures we may take for granted can pollute ground water:

- Drilling to install pilings requires lubricants that can seep into aquifers. Deciding what, where and how to build has an effect on requirements for pilings.
- Water features must be designed carefully to deliver their microclimate benefits rather than simply serving as decorations that lose water through evaporation and provide no benefits, which subtly suggests that water conservation is unimportant.
- Respect for water also includes understanding the power of peak rain floods and climate change-based rises in sea levels, along with adoption of resilient design solutions to address these threats.
- A significant section of the developed area of Doha's West Bay, not just the part along the shore, is subject to flooding due to the expected water level rise that climate change will cause, according to Interim Coastal Development guidelines from the Ministry of Municipalities and Environment. **(Ref. 6.4.2)**.
- Designs of underground parking access ramps, locations of electrical rooms and other project components generally do not showcase a duty-of-care approach regarding this threat.

Amid the need to keep water out of facilities, there remains the need for efficient use of the water we have. As noted in the World Building Design Guide **(Ref. 6.4.3)**, a program of the U.S.-based National Institute of Building Sciences, "There are a number of strategies that can be employed to reduce the amount of water consumed at a facility. These methods include system optimization (efficient water systems' design, leak detection, and repair); water conservation measures; and water reuse/recycling systems.

Tactical measures in pursuit of these strategies include:

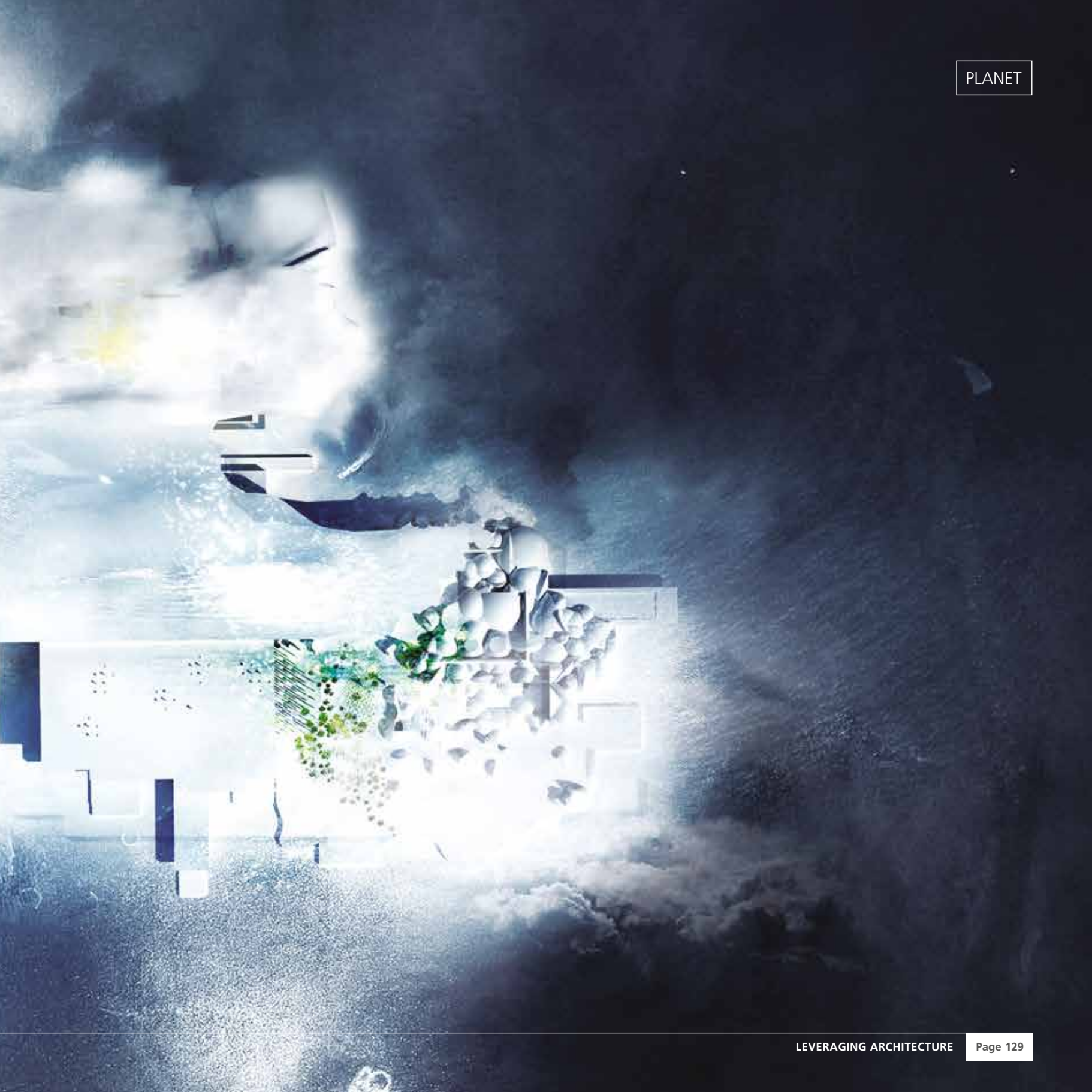
- Water-efficient plumbing fixtures.
- Irrigation and landscaping selection measures.
- Water recycling or reuse measures.
- Reduction of water use in HVAC systems or water recovery from HVAC.

References

Ref.6.4.2: Ministry of Municipality and Environment (2017), Interim Coastal Development Guidelines.
Retrieved from: http://www.mme.gov.qa/QatarMasterPlan/Downloads-qnmp/Regulation/English/Group3-Guideline/036_Interim Coastal Development Guidelines August 2017.pdf

Ref.6.4.3: Joseph Bourg (2016), Water Conservation.
Retrieved from: https://www.wbdg.org/resources/water-conservation

SEALIGHTS ISLAND
The facility emerges as an ambiguous island of sea water. The water medium is celebrated for sport (diving center), wellness (baths), leisure (aquarium), science (research center). Water is used as a sculpted precious material enabling micro climates, not as a decorative expandable accessory.



2015 – WATER RECIPE GARDEN
To celebrate local and regional biodiversity, planters outside the building display native and semi-native trees, grass, bushes, plants and flowers. Some trees are planted in underground parking areas, which connects visitors to the natural ground and displays the trees' canopies at the plaza level.

6.5 Land Biodiversity

> “Accordingly, the loss of biodiversity must be a concern of all. Losing diversity of plants, insect and animal species poses serious threats to communities across the world’s global village.”

Business and life opportunities emanate from diversity. A fundamental pillar of the advocacy of globalization is the maintenance of a diverse ecosystem of operations. Any actions resulting – by engineering intent or deficiency – in the reduction of possibilities creates an ultimate absence of resilience and interdependence of operations. History does not always show evidence of a constant drive for equilibrium but it definitely shows evidence of the necessity for the possibility of competition and choice. The consolidation and monopoly that results from the suppression of competition and choice have always been detrimental to the drive for progress and fairness that supports thriving communities.

Accordingly, the loss of biodiversity must be everyone’s concern. Losing diversity of plants, insects and animals poses serious threats to communities across the world’s global village.

A late-2018 report from the World Wildlife Foundation **(Ref. 6.5.1)** shows that land-based biodiversity has declined sharply since the mid-1970s, due to human activity.

- The organization’s Living Planet Index has recorded an overall decline of 60% in species population sizes between 1970 and 2014.
- The Living Planet Index shows species population declines are especially pronounced in the tropics, in South and Central America.
- Today, 60 percent of the world’s major marine ecosystems that underpin livelihoods have been degraded or are being used unsustainably.
- Marine Protected Areas (MPAs) are essential to conserve the biodiversity of the oceans and to maintain productivity, especially of fish stocks. World Heritage marine sites represent in surface area one third of all marine protected areas.
- Approximately 12 percent of the land area is protected, compared to roughly 1 percent of the world ocean and adjacent seas **(Ref. 6.5.2)**.

Urbanization and the power of our artificial processes and inventions sometimes dangerously draw us away from the indispensable requirement for a resilient link to nature. We can wrongly believe our mostly urban life is somehow dissociated from nature’s biodiversity. We often fail to believe we can meaningfully participate in the everyday vital battle against the loss of biodiversity.

Every actor on the institutional and corporate scene has strong, meaningful power to reduce the loss of biodiversity. While builders and designers – operating as agents of institutions and corporations – bear some responsibility for developments created with insufficient care or blatant neglect for biodiversity, they also have the tools, under a strong mandate from their clients – to address them.

These concerns draw attention locally and globally, through the United Nations and Qatar’s National Development Strategy. The Strategy devotes a chapter to the requirement for sustainable development that preserves the environment; the document also addresses challenges related to climate and environmental realities.

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Ref.6.5.1: WWF (2018), Living Planet Report - 2018: Aiming Higher.
Retrieved from: https://www.worldwildlife.org/pages/living-planet-report-2018

Ref.6.5.2: UNESCO (2012), Facts and figures on marine biodiversity.
Retrieved from: http://www.unesco.org/new/en/natural-sciences/ioc-oceans/focus-areas/rio-20-ocean/blueprint-for-the-future-we-want/marine-biodiversity/facts-and-figures-on-marine-biodiversity

Cont’d.

EDUCATION CITY OXYGEN PARK
Contemporary, effective features, including gardens with a collection of diverse plants, shrubs and trees that help create microclimates, make the 130,000-square meter park enjoyable for people of all ages. The landscaping design directs breezes through passages carved between gardens.

6.5 Land Biodiversity

The UN addresses the issue in its 17 Strategic Development Goals, detailing the need and means to halt biodiversity loss.

Brownfield developments too often remove natural plants, reduce surface area for water to return to the soil and drive away animals. In addition developers and designers of significant projects harm biodiversity by focusing on a narrow selection of softscapes that are deemed affordable and easier to maintain. It is common to choose plants that grow quickly, look appealing and lack thorns, even though they are not suitable for bees, insects and birds. These plants then become most commonly available in nurseries, which in turn further reduces the choice of plants available for consumers to buy. A lack of recognition of the cultural and environmental richness of native solutions also fuels the dangers of introducing invasive species, which can cause vast loss of their indigenous counterparts, to say nothing of the waste of irrigation water.

In a geopolitical context, highlighting the importance of resilience and sustainability is a necessity, and in order to celebrate specific attributes that are borne out of generations of natural selection, the recognition and nurturing - and even reintroduction - of native species is essential and symbolic to reinforce communities' sense of pride in their history.

When it created Oxygen Park, a 130,000-square meter complex in Education City (Al Rayyan), Qatar Foundation made a point of rejecting a typical narrow-spectrum softscape selection approach. It chose to landscape the site with native and semi-native plants from throughout the country, to include the Sidra tree, which is featured in the Foundation's logo, supported by a specialist QF nursery. The Qatar In Spring program of developing native and semi-native plant species is also part of a nationwide drive to reinforce the overall ecosystem of insects, birds and animals that thrives in these softscapes.

The park has won international praise for its features and design, which was inspired by rocks eroded by winds of the desert and its flowing terrain. Running paths are crafted to include hills and wind-cooled sections. The Sidra tree "growing strong and proud in the harshest of environments, has been a symbol of perseverance and nourishment," Her Highness Sheikha Moza bint Nasser has said. "With its roots bound in the soil of this world and its branches reaching upwards toward perfection, it is a symbol of solidarity and determination; it reminds us that goals of this world are not incompatible with the goals of the spirit."

7. Conclusion

In our time of need for "strengthening the global response to the threat of climate change, sustainable development and efforts to eradicate poverty" as the UN International Panel on Climate Change report SR 15 **(Ref. 7.1)** puts it, institutions' and corporations' building projects must be executed with a mindset which empowers stakeholders to make their project:

- A valuable contributor to governmental policymaking efforts.
- An active and empowered agent of their corporate social responsibility.
- A strong tool for employee engagement and retention.

An Urban Land Institute (ULI) summary report for decision-makers **(Ref. 7.2)** reviews the Accord signed during the 21st annual Conference of the Parties (COP-21) to the United Nations Framework Convention on Climate Change. The Accord has been signed and ratified by Qatar **(Ref. 7.3)** and the ULI summary report identifies that:

- "Buildings account for about a third of climate change–causing global carbon dioxide emissions, more than any other sector, meaning that changes to newly developed and existing buildings will play a significant role in mitigating climate change. At the same time, it will be critical to adapt the built environment to withstand the impacts of a climate that is already changing profoundly. The Paris Agreement places equal weight on this so-called climate adaptation imperative."
- "The first priority for organizations should be to audit their organization's resilience to the post-COP-21 impacts outlined in this paper. That audit should include reviewing the risk exposure of their assets and the capabilities and expectations of their stakeholders. The most effective framework for assessing the impacts of climate change and the implications of the Paris Agreement will likely be unique to individual entities."

As we've shown, building projects can create financial and human successes for decades while serving as productive elements of forward-thinking communities.

These long-term benefits are the result of clients collaborating with architects to create projects based on the Triple Bottom Line framework, which serve social, economic and environmental needs.

A detailed project specific strategic design brief - included in the tender documents for procurement of the architect - must be thorough about the Triple Bottom Line objectives of the client.

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Ref.7.2: Urban Land Institute (2016), L'Accord de Paris: A Potential Game Changer for the Global Real Estate Industry.
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8. Referenced Architecture Projects

All projects referenced have been managed by ASTAD under Project Management / Construction Management scope and / or concept designed with ASTAD Design Services.

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أستاد
ASTAD

P.O. Box 23242, Doha, Qatar
T (+974) 4425 8234
F (+974) 4425 8452

info@astad.qa
www.astad.qa
#ASTADQA

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