National Broadband Plan

for the State of Qatar

ictQATAR

Ministry of Information and Communications Technology

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Foreword

In the last decade, our nation has witnessed tremendous progress in building an advanced ICT sector that spurs economic growth and competitiveness, enhances the efficiency of public services, and improves the quality of life for individuals as well as society overall. To date, the country's ICT market has skyrocketed, with the latest data showing that it has grown an average of 17 percent a year for the last five years – and from QAR 12.8 billion to 15.5 billion between 2010 and 2011 alone.

High-speed broadband is the next major step in ourjourney to becoming a knowledge economy and information society. Broadband is transforming the way we live now, fueling both social and economic good. Already, broadband-enabled applications touch nearly all aspects of our lives, from government and business to health and education.

The next decade will undoubtedly see broadband occupying an even larger role in our daily lives. The demand for high-speed broadband is only expected to boom in Qatar and across the globe, as awareness of the possibilities offered by broadband grows among consumers and businesses, and barriers to widespread adoption, such as privacy and security worries as well as affordability concerns, are addressed. However, as demand continues to increase, the supply of high-speed broadband has not kept pace in Qatar or around the world. The speed and affordability of both fixed and mobile broadband remain major issues.

We must continue to address these challenges and to improve and expand broadband infrastructure and connectivity if we expect to be able to harness the true power of ICT to enrich people's lives and secure a bright future for Qatar.

The Ministry of Information and Communications Technology has developed this National Broadband Plan jointly with relevant stakeholders, with its broad objective to promote broadband market development and provide high-quality, high-speed, and affordable services to all. Thisdocument lays out four ambitious targets that will help ensure that the opportunities offered by broadband technology are realized and maximized. The Plan also highlights four key policy action areas where public and private stakeholders must concentrate their attention, including supporting healthy competition; ensuring the effective management of resources; ensuring public awareness and broadband take-up; and maximizing broadband benefits by focusing on the extensive and high-quality supply of broadband content and services.

The National Broadband Plan is an ambitious blueprint for change. It was developed by numerous stakeholders and its inclusiveness reflects the fundamental collective effort that is required for its successful implementation. After all, this is not just the government's plan. It belongs to all of us in Qatar and its success – which will also drive the continued prosperity and success of our nation – depends on all of us.

Dr. Hessa Sultan Al-Jaber
Minister of Information and Communications Technology

Executive Summary

The Government of Qatar, through the Ministry of Information and Communications Technology (MICT), recognizes the importance of broadband connectivity in achieving the 2030 national vision for human, social, economic and environmental development. This document, Qatar's first national broadband plan (the Plan), provides the guidelines and actions that the nation needs to follow in the next decade to ensure the opportunities offered by broadband technology are realized and maximized.

Qatar's leadership has set visionary objectives for the nation across four key pillars, namely economic, social, human and environmental development. As the economy diversifies away from hydrocarbons, a knowledge society is set to emerge, competing at a global level across all fields of learning. To be successful, such a change has to be sustainable, ensuring that the road to prosperity is both material and intellectual, but also ensuring that this change aligns with the universal values of human rights, the respect of Qatar's moral standards and traditions, as well as the imperatives of environmental protection. Broadband connectivity is set to be a key enabler of this change across all four development pillars.

The Plan's overarching objective is to support and promote broadband market development. This entails providing high-quality, affordable and high-speed broadband services to all, in order to support the human, social, economic and environmental development of Qatar for the benefit of both the nation and its residents.

The Plan fulfills the dual purpose of reflecting the government's commitment to broadband and providing guidance to the market. It describes a set of four action areas, each containing short-term and long-term cross-sector policy actions, the implementation of which will be crucial to achieving the Plan's overarching objective. To track the fulfillment of these initiatives and to provide a catalyst for their achievement, the following set of targets is proposed:

1. All of the population to have the ability to choose between a minimum of two broadband retail providers by 2016, irrespective of location.
2. Ninety-five percent of households to have the ability to access affordable and high-quality broadband service of at least 100 Mbps effective download and 50 Mbps effective upload speeds by 2016.
3. All businesses, schools, hospitals and government institutions to have high-quality access to at least 1 Gbps effective symmetrical speeds by 2016.
4. Digital literacy to be expanded to all of the mainstream population by 2016, in conjunction with guarantees of the user's digital privacy, protection of personal data and freedom of opinion and expression.

The road ahead has a number of obstacles and challenges. By providing the required guidance, the Plan is intended to remove barriers to broadband development. Ultimately, however, it is the contribution of public and private institutions, as well as individuals, that will drive the success of this Plan.

Definitions

Ashghal	Public works authority
CS/Q-Cert	Qatar Computer Emergency Response Team
DCMF	Doha Centre for Media Freedom: nonprofit organization working for press freedom and quality journalism in Qatar
Es'hailSat	The Qatar Satellite Company, which launched the broadcasting and communications satellite Es'hail 1 in August 2013
GCC	Gulf Cooperation Council: political and economic union including Qatar, Bahrain, Kuwait, Oman, the UAE and Saudi Arabia
Government Network	Secure direct communication link among Qatar's government agencies, allowing for improved data sharing, enhanced security for e-services and continuous availability
GSMA	GSM Association: association of mobile industry companies working toward the standardization and support of the GSM system
Hukoomi	Official government Web portal of Qatar: gateway to information about the country, connecting members of the public with government services, programs and initiatives
ICT	Information and communications technology
IPv6	Internet Protocol version 6
ITU	International Telecommunications Union: United Nations agency for information and communications technology
Mada	Qatar's assistive technology center: nonprofit organization that aims to empower and enable persons with disabilities and the elderly through assistive technology
Mainstream expatriates	Foreign workers, excluding transient labor force
Mainstream population	Qatari citizens and mainstream expatriate population
Megaprojects	New real estate developments under construction or recently constructed in Qatar
MICT	Ministry of Information and Communications Technology

Qatar's National ICT Plan (ICT 2015)	Government plan for Qatar's ICT strategy through 2015, promoting the development of the country toward becoming a knowledge-based economy
NCIS	National Committee for Internet Safety: committee formed to raise awareness about Internet safety issues and improving online-safety education
Ooredoo	Licensed service provider in Qatar for fixed and mobile services
Public sector	Government ministries, agencies and public organizations in Qatar
Qatar Foundation	Government-supported, nonprofit organization striving to make Qatar a leader in education, science and research
Qatar National Vision 2030	Vision and long-term objectives for Qatar across four key development pillars (human, economic, social and environmental)
Qnbn	Qatar National Broadband Network: passive fiber infrastructure available on an open-access basis
SME	Small and medium enterprises: includes companies between two and five years old, having fewer than 50 employees, or fewer than 150 employees if in the construction and manufacturing sectors; and companies more than five years old, with fewer than 250 employees
Transient laborers	Low-skilled or unskilled foreign labor force residing in labor camps
Vodafone	Licensed service provider in Qatar for fixed and mobile services

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Toward the 2030 National Vision:

Why Broadband Matters

The future is notoriously difficult to predict. However, one certainty that prevails is that broadband has the potential to play a central role in everyone's daily life, vastly improving their well-being. Recognizing this is the first step in a journey that will make Qatar a leading broadband economy in the region.

Growth in demand for broadband access is expected to be driven by the continuous evolution of communication and storage technologies, increasing device sophistication, and the expanding role of the Internet and the applications it powers. Ever-increasing amounts of visual and audio data are being created, stored and accessed, and the networks providing access to this content are becoming ever more extensive.

As awareness of the possibilities offered by broadband grows among consumers, so too will their expectations. Video, which makes up about half of all Internet traffic, will continue increasing in quality, with next-generation high-definition standards requiring even more bandwidth. As the devices that produce such content become more affordable and popular, this will increase the amount of data produced, with users taking advantage of share-enabling technology, whether on social networking sites or through cloud applications. Similarly, the proliferation of devices used to access such content (including laptops, tablets, cellular phones and nascent next-generation devices such as head-mounted displays), advances in mobile and wireless network technology enabling ubiquitous access to broadband, and the development of increasingly sophisticated applications leveraging the cloud will further drive growth in broadband traffic.

Cloud Services

Breaking with the traditional approach where IT infrastructure and applications are owned by users, cloud services offer business and residential users the opportunity to access computing power, storage capacity and application services over the Internet, on an on-demand self-service basis. By providing users with elasticity and charging them only for what they use, business models are changing, enabling companies to become more rapidly operational without incurring the cost of deploying their own IT infrastructure. Ubiquitous and reliable broadband is essential to benefit from cloud services, with required download and upload speeds adapted to the user's needs.

But data-producing devices will not be limited to individual use. The Internet of things, built on the back of smart-sensor proliferation, will drive the expansion in the number of connected devices. Machine-to-machine (M2M) communication (the transmission of data collected by sensors or metering devices) is set to play a key role at all levels of the broadband ecosystem, ranging from individuals to local communities and entire cities, with applications such as smart meters being used for remote, real-time energy monitoring and control. The wealth of data collected will also be driven by "Big Data," referring to the collection and analysis of customer activities online and offline, increasing bandwidth demand, but also creating pressing dilemmas regarding issues of privacy that will have to be addressed.

Broadband-enabled applications will also give residents the opportunity to increase their civic engagement and benefit from increased economic opportunities. Improved availability and access to information and public services will empower the individual, allowing him or her to play a more active

role in society. The availability of high-speed broadband will open up access to a number of opportunities that will not be the privilege of a connected few, but the prerogative of all. High-speed, affordable and ubiquitous broadband will remove the barrier to the take-up of cloud services, benefiting businesses of all sizes, while it will also support the development of integrated e-services, such as e-health, which has the potential to provide more relevant and efficient medical care closer to patients' homes. Home monitoring of patients, for example, using video links, could also contribute to reducing the load on hospitals, while enabling quick intervention where necessary. Education also stands to be affected positively, with access to global knowledge being made more ubiquitous and enabling more people to follow their academic interests and develop professional careers. The ability to access online learning will remove geographical limitations, while also benefiting more population segments, such as people with special needs.

These are just a fraction of the numerous opportunities made available with access to high-speed ubiquitous broadband. The next decade will undoubtedly see new opportunities emerge and broadband occupying an ever-growing role in our daily lives.

1.1 Background to the Plan

Qatar is undergoing an unprecedented phase of development. Multiple reports place the level of infrastructure spending at around USD 200 billion in the next decade, with the majority of it earmarked for transportation. The 2022 FIFA World Cup provides a unique opportunity for Qatar to enhance its global standing and demonstrate how its investment in technology can enable a host of new digital services for both visitors and international viewers alike. Already, Qatar has started becoming a growing hub for conferences and sporting events regionally and globally, making the need for such services more immediate. While the economic aspect of this development phase is currently being felt the most, it will be accompanied by social and environmental change, affecting citizens and residents on multiple fronts. Broadband has the potential to direct that change according to the interests of Qatar.

As the country strives to reduce its dependency on natural resources, a digital economy, enabled by broadband, will have to play an increasingly prominent role in achieving economic growth and diversification. The expected rise in population will be accompanied by increasing pressures on the local environment, making it even more important to address Qatar's carbon footprint, an objective to which broadband can contribute. Care will also need to be taken with regard to managing the impact of broadband on Qatar's heritage, traditions and values, while at the same time ensuring the unhindered emancipation of broadband users. The Plan balances the objectives of Qatar's development with the imperatives of sustainability in the local market context.

Qatar's broadband market sits today at a crossroads. On the one hand, broadband penetration is high, while state-of-the-art fixed and mobile technology is being deployed. On the other hand, limited competition in the fixed broadband market is significantly holding back Qatar's development. The range and reliability of broadband services on offer to both consumers and businesses is limited,

while significant gaps remain in ICT literacy levels. Clarity and direction are needed to provide certainty to corporations and large real estate developers in the process of deploying telecom networks. Qatar's residents also need to be assured that they can use broadband services safely, implying not only that they have the required capabilities and skills, but just as importantly, feel confident that their online activities will not affect their privacy and security. Maintaining the status quo is not an option. The Plan provides the necessary actions to maximize the use of broadband in terms of human, social, economic and environmental development aspects for Qatar.

1.2 The National Broadband Plan in the context of existing initiatives

Qatar's General Secretariat for Development Planning published the *Qatar National Vision 2030 (QNV 2030*) in 2008,[1] in which it defined the long-term objectives of the country across the human, social, economic and environmental development pillars. *QNV 2030* envisages a prosperous society for all inhabitants, built on a diversified and competitive economy, and relying on high moral standards and respect for the environment.

A first step has already been taken in the right direction, in the form of the *National ICT Plan 2015 (NIP 2015)*.[2] Recognizing the crucial contribution of information and communications technology (ICT) in achieving the long-term objectives described in *QNV 2030, NIP 2015* defined a first set of goals for 2015, notably:

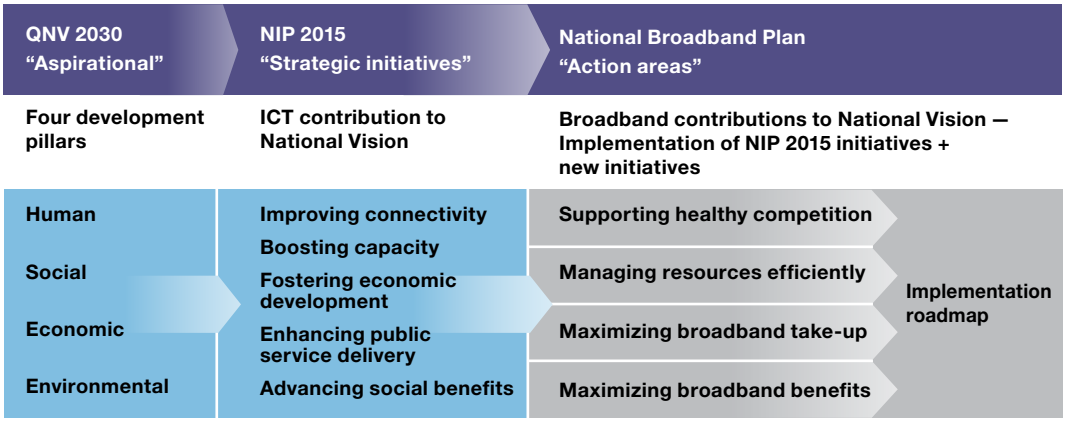
- doubling ICT's contribution to Qatar's GDP
- achieving ubiquitous high-speed broadband access for 95 percent of households and businesses
- achieving ICT and Internet adoption by 90 percent of the population and across all segments

The Plan is aligned with the *QNV 2030* and the objectives of *NIP 2015*, and ensures that Qatar maximizes the opportunities arising from the FIFA World Cup in 2022. It demonstrates Qatar's commitment to becoming a leading digital economy. Due to technological advances in fixed and mobile broadband technology, as well as the rapid pace of development of Qatar, the Plan will need to be reviewed and maintained regularly to adapt to these changes. The next review will happen in 2016, matching the target date for the achievement of the four targets.

1 http://www.gsdp.gov.qa/portal/page/portal/gsdp_en/qatar_national_vision/qnv_2030_document/QNV2030_English_v2.pdf

2 http://www.ictQatar.qa/sites/default/files/documents/Qatar%27s_National_ICT_Plan_English.pdf

Figure 1: The National Broadband Plan in the context of existing initiatives



1.3 Objective and structure of the National Broadband Plan

The National Broadband Plan is a roadmap toward the realization of a number of broadband development initiatives. It extends *NIP 2015* not only through its longer time horizon (set for the 2022 FIFA World Cup), but more importantly by following a diagnosis-based approach to identifying the current barriers preventing Qatar from achieving its ambitions. Four action areas have been identified to help overcome these barriers, each containing specific initiatives:

Supporting healthy competition – Policy actions required to foster real competition in the market. This set of actions will support the effort toward achieving the first broadband target (all of the population to have the ability to choose between a minimum of two broadband retail providers by 2016, irrespective of location).

Ensuring efficient management of resources – Policy actions required to ensure that fixed and mobile infrastructures are deployed in the most efficient and rapid manner, while spectrum and international capacity are optimally managed and do not constitute a constraint to broadband adoption. This set of actions will support the effort toward achieving the second and third broadband targets (95 percent of households to have the ability to access affordable and high-quality broadband service of at least 100 Mbps effective download and 50 Mbps effective upload speeds by 2016; and all businesses, schools, hospitals and government institutions to have high-quality access to at least 1 Gbps effective symmetrical speeds by 2016).

Ensuring broadband take-up – Policy actions that address digital literacy, affordability, quality of service, awareness and safety barriers, and that ultimately ensure the universal take-up of broadband in Qatar. This set of actions will support the effort toward achieving the fourth broadband target (digital literacy to be expanded to all of the mainstream population by 2016, in conjunction with guarantees of the user's digital privacy, protection of personal data and freedom of opinion and expression).

Maximizing broadband benefits – Policy actions addressing the need for an extensive and high-quality supply of broadband content and services that will drive adoption. This set of actions will support the effort toward maximizing the adoption of broadband in the country.

The Plan is structured in eight chapters, including the present one. Chapter 2 presents the short-term and long-term targets for Qatar, providing the rationale for their selection. Chapter 3 provides an overview of the state of the broadband market in Qatar, and lists the identified barriers to broadband development. Chapters 4 to 7 constitute the core of the Plan, and correspond to each of the four action areas for which policy actions are defined. Responsibility has been assigned to the relevant stakeholders for each of the policy actions, according to the RACI principles: Responsible, Accountable, Consulted and Informed. Chapter 8 provides practical recommendations for the implementation of the actions included in this Plan. ■

2 Setting Broadband Targets

The primary objective of the Plan is to focus on the development of a rounded set of policy measures to support broadband market development. For the purpose of this plan, basic broadband is defined as a service offering 8 Mbps effective download and 4 Mbps effective upload speeds, to ensure a comfortable experience for the basic services of browsing, video communication and entertainment, but also to stimulate the adoption of higher-speed broadband services. By addressing both supply- and demand-side considerations, the Plan includes specific objectives to stimulate adoption for all key contributors in the broadband ecosystem.

While speed, coverage and take-up are essential metrics to determine the success of broadband within a country, they cannot be expected to drive the success of the entire broadband ecosystem alone. Taken in isolation, they represent an uncertain metric in the context of a rapidly evolving technology and set of services, but they also do not address the development needs for a multitude of vital broadband components linked to stimulating demand, which also need to have their targets set.

Nonetheless, setting specific targets is essential for stakeholders to quantify their objectives, point in the right direction and track the fulfillment of the policy actions. As such, the Plan sets forward the following four targets.

Target 1 **All of the population to have the ability to choose between a minimum of two broadband retail providers by 2016, irrespective of location**

Robust competition is a key driver of consumer welfare and innovation. It lowers prices, improves quality of service and promotes the development of new services, ultimately providing more choice to consumers and businesses alike. Presently, there is limited competition in the provision of high-speed broadband services in Qatar, with users having access to only one service provider in their respective geographies. Promoting the development of effective competition is a key priority for the government. This target aims to overcome the key barrier restricting broadband service deployment and take-up in Qatar. The 2016 target corresponds to the expected end of the national broadband network deployment, which will form the basis for true broadband competition in the country.

Target 2 **Ninety-five percent of households to have the ability to access affordable and high-quality broadband service of at least 100 Mbps effective download and 50 Mbps effective upload speeds by 2016**

End-user demand patterns and the need for sufficient service quality define bandwidth requirements. In the period to 2016, the types of applications that will be in use are relatively predictable, and as such so is the bandwidth that will be required. A target of 100 Mbps availability will ensure households have comfortable access to any of the expected applications in use, including access to the most bandwidth-hungry, ultra-high-definition media and home-office/virtual private network applications. The 2016 objective is directly linked to the current fiber investments being made in the country and the pace of their deployment.

Target 3 **All businesses, schools, hospitals and government institutions to have high-quality access to at least 1 Gbps download and upload speeds by 2016**

Business-continuity requirements are becoming more stringent globally, and there is growing intolerance to business downtime. In this context, the need for regular backup of mission-critical information to remote data centers becomes more acute. Enterprises and public institutions will be given the possibility to benefit from 1 Gbps download speeds offered by service providers. Such links will also be beneficial to institutions with multiple locations that require high-availability and low-latency services, which are of particular importance in the context of integrated e-service deployments.

Target 4: **Digital literacy to be expanded to all of the mainstream population by 2016, in conjunction with guarantees of the user's digital privacy, protection of personal data and freedom of opinion and expression**

Qatar's population will ultimately be the driver of broadband demand, but also a key contributor to the economy as a whole. To ensure innovation thrives across all sectors, the ability to know how to use information and communications technologies to access and create data responsibly is required at all levels, from government to businesses to individuals. Ensuring participation in the broadband economy will, however, also be dependent on users' trust: confidence-building measures will have to be implemented to guarantee safety and privacy, but also to ensure that creativity and innovation are not stifled by the risk of repressive measures stemming from an unclear free-speech policy. Such a target is ambitious, and not one that is achieved overnight. It is, however, an essential one, which will require significant government intervention.

The targets relating to speed metrics are characterized by symmetrical, or close to symmetrical, download and upload speeds. This translates the will of Qatar to make its residents active participants in the broadband ecosystem, rather than mere consumers. ■

3 The State of Broadband in Qatar

The last years have witnessed a significant increase in broadband adoption by Qatar's population, through both fixed and mobile technologies. A sustained effort by public institutions and private entities has provided the necessary boost, but several issues are preventing the full power of broadband from being unleashed across all market segments. The sections below provide an overall description of the state of broadband in Qatar.

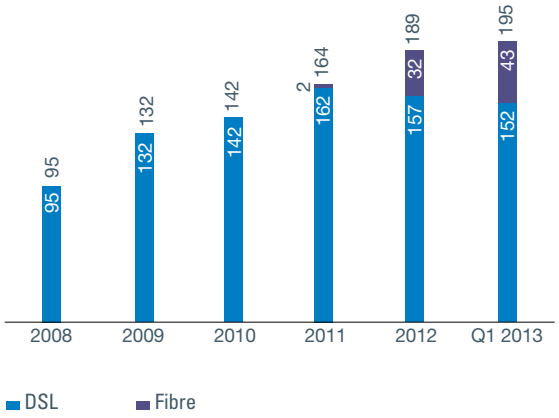
3.1 Broadband adoption

Understanding Qatar's unique sociodemographic structure is a prerequisite to any analysis of broadband adoption in the country. While it has a small citizen population of fewer than 250,000 people, Qatar is a nation in the middle of an economic and construction boom. This is sustained by a sizable population of expatriate workers, split between mainstream expatriates (skilled workforce) and the transient labor force (low- to unskilled workforce). These expatriate workers outnumber Qatari citizens, and therefore represent a significant factor in the sociodemographic makeup of Qatar's economically active population. However, the sizable transient labor force does not enter into the definition of households, as they reside primarily in dormitory compounds with multiple tenants per room. In addition to laborers in the construction industry, there are also many expatriate domestic workers, increasing the average household size and driving the number of households lower.

Fixed broadband adoption in Qatar, defined as a 256 kbps downstream speed or higher, by the International Telecommunications Union (ITU), has increased steadily in the past few years. At the end of the first quarter of 2013, there were 195,000 fixed broadband subscribers, of which an increasing proportion relied on fiber (see Figure 2). This corresponds to a fixed broadband household penetration of 69 percent; however, recent estimates by the ITU suggest this figure now reaches 78 percent of households, ranking Qatar fourth among benchmarked countries (see Figure 5). Research indicates that most subscribers were taking lower-speed packages (Figure 4), driven by the high cost of higher-speed broadband services and a lack of awareness of the benefits from higher throughputs.

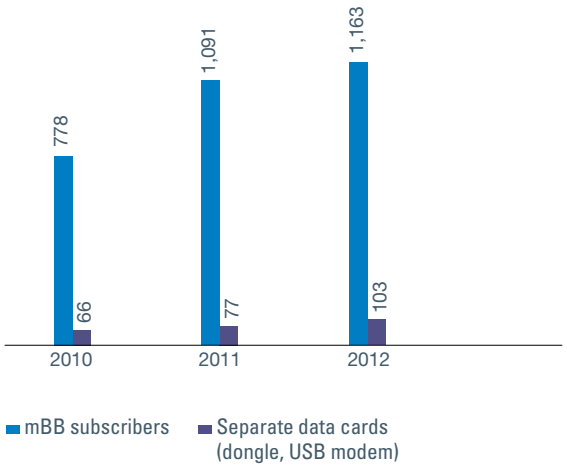
As for mobile broadband (again following the ITU definition of advertised downstream speeds equal to or higher than 256 kbps), a total of 1.3 million connections were recorded at the end of 2012, the majority representing data access over handheld devices (Figure 3). This represents a penetration of approximately 40 percent when compared to the estimated 3.2 million mobile connections in Qatar, on the back of the proliferation of data-friendly handsets in conjunction with a drop in mobile data tariffs. Mobile broadband access using modems or dongles was limited at around 100,000 connections.

Figure 2: Evolution of fixed broadband adoption in Qatar



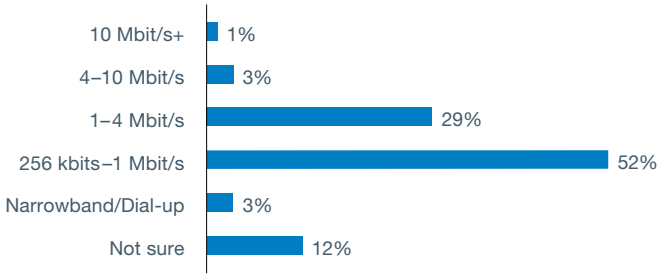
Source: MICT

Figure 3: Evolution of mobile broadband adoption in Qatar per access medium



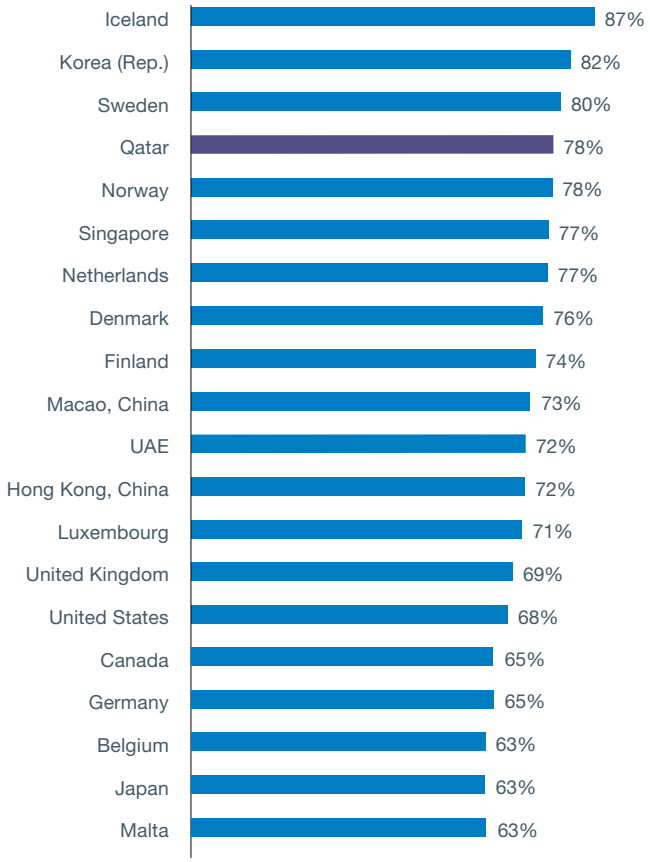
Source: MICT

Figure 4: Internet speeds in households with Internet access



Source: MICT – *Qatar's ICT Landscape 2013: Households and Individuals*

Figure 5: Fixed broadband household penetration



Source: Qatar: MICT 2012. UAE: TRA ICT household survey 2012, n=2,045. All other countries: ITU Telecommunication / ICT Indicators database 2009, 2010, 2011

3.2 Barriers to broadband development: facts and implications

Despite its healthy broadband adoption rates, a number of barriers have been identified as impeding the establishment of a broadband ecosystem in Qatar:

- limited fixed broadband competition
- inefficient management of resources
- issues stifling broadband demand
- supply-side barriers, including limited content and services, and an insufficiently adequate environment to support the adoption of such services

3.2.1 Limited fixed broadband competition

Fixed services remain a necessity for the broadband experience of corporate and residential users alike, despite advances in mobile broadband technology. Fixed line infrastructure—especially fiber—can provide far better performance than is possible over mobile broadband alternatives.

Two service providers contend for the retail telecom market in Qatar: Ooredoo and Vodafone are both licensed to provide fixed and mobile services. While competition in the mobile market is well established, the situation is different in the fixed market. A major difference exists in the deployment of fixed infrastructure between Ooredoo and Vodafone: Ooredoo owns the copper network and is rapidly rolling out a fiber-to-the-home network throughout the country, while Vodafone is relying on the rollout of passive infrastructure provider Qnbn for its fixed network. Qnbn, like Ooredoo, is also engaged in deploying a nationwide fiber network, but its current coverage is limited to the real estate developments like: Barwa City, Barwa Commercial Avenue and most recently, the West Bay Central Business District. While Ooredoo's fiber rollout has been instrumental in placing Qatar among the most connected countries globally, Qnbn's deployment is crucial to establishing competition in fixed services.

The establishment of competition is however being slowed by several obstacles. Access to rights of way to existing infrastructure is complex and time-consuming. The deployment of a passive fiber network to be used as the basis for competition in new real estate developments ("megaprojects") is also proving to be challenging. Faced by pressing time constraints, developers favor partnering with vertically integrated operators on an exclusive basis, where the latter can install and operate the end-to-end network. While regulatory instruments are being developed to avert this, the complexity behind the enforcement of regulatory decisions means that such instruments are not always implemented, leaving the door open to a situation of monopoly in these developments. This will ultimately affect both investment sustainability and the establishment of true competition. Regulatory enforcement is rendered more difficult by the absence of a truly independent regulatory authority, as its current dependency on the MICT affects its credibility and limits its maneuvering ability.

Finally, as fixed competition expands and becomes available to businesses, the need for fixed number portability becomes more pressing. Assuming businesses are willing to switch service providers, they are currently faced with the requirement to change their fixed numbers, representing a significant barrier to switching.

3.2.2 Inefficient management of resources

The resources to ensure ubiquitous broadband across Qatar's population are many. They include the infrastructure itself (e.g., physical fiber network and ancillaries), spectrum for mobile broadband, international bandwidth capacity and the financial, labor and material resources to make this a reality. They also include an effective service offering, which is essential to maximize the benefits of broadband connectivity. A number of bottlenecks to efficiency have been identified, the resolution of which should support rapid market development.

Currently, both Ooredoo and Qnbn are deploying fiber networks throughout the country. While this theoretically facilitates the establishment of infrastructure-based competition, the different licenses under which both entities operate raise particular challenges that call for the review of the situation, in order to:

Ensure the viability of Qnbn, which was set up to serve as a passive wholesale provider of fixed telecom services to Qatar's current and future licensed operators.

Provide clarity to real estate developers on the process to follow for their broadband network

deployment needs within their projects. This is of particular concern in the current construction boom, with extensive new residential and business areas being developed (megaprojects) for which developers have to adhere to tight schedules and ensure that fiber networks are deployed relatively early in the construction process.

Ensure the sustainability of investment in communication networks, attempting to minimize duplication for the sake of financial and labor efficiency.

With increasing broadband access through mobile devices and constant technological evolution, the need for efficient use of spectrum (building on the latest international developments) is becoming all the more pronounced. A spectrum release and allocation plan is not currently in place, and is urgently required to ensure that Qatar positions itself at the forefront of mobile technology use.

Allocation of international capacity is an equally important element in efficiently addressing the growing international bandwidth need and concerns with its availability. The market for international capacity is only open to Qatar's licensed telecom operators, which control the amount of bandwidth made available within the country. Organizations with significant connectivity needs are therefore dependent on these operators and find service lacking and expensive. Some of Qatar's neighboring states, by contrast, have an open-access policy in place.

Finally, resources also include the physical infrastructure required to deploy fixed and mobile networks. To date, it has proved difficult to gain rights of way to existing ducts and poles for fiber deployment, rooftops or private land for the establishment of mobile base stations, or buildings for vital interconnection requirements and colocation space. This has the effect of delaying network deployment in the country, and even leading to sub-optimal network designs.

3.2.3 Demand-side barriers: awareness, affordability and safety concerns

Despite the efforts made by Qatar's public institutions to promote broadband take-up, a number of demand-side barriers remain. These present a direct risk to economic diversification and foreign investment in Qatar.

The Qatari population suffers from low ICT literacy across certain sub-groups (women, senior citizens and youth).

The affordability of fixed broadband services remains a particular concern, slowing the adoption of higher-speed broadband packages for both consumers and businesses.

Lack of awareness of the benefits of having a media presence, and lack of trust in the underlying infrastructure that enables cloud services, especially in the SME segment. Added to concerns over affordability, this is affecting companies' performance, competitiveness and growth prospects, as it limits their efficiency and access to wider markets. It is widely expected that with proper competition in the provision of broadband services, these reservations will decrease.

Safety concerns exacerbated by cultural and religious aspects are keeping people away from subscribing to broadband access. A lack of knowledge surrounding data privacy and the use of private data by third parties or other individuals are of particular concern, as witnessed by numerous incidents originating from social networks. Additionally, there is a recognized gap in ICT knowledge

between parents and children. Where parents have minimal ICT knowledge, there will be no safeguards for children, who may be exposed to inappropriate content. In other cases, parents with some limited ICT knowledge may be against broadband as a matter of principle (as they see the risks to more vulnerable family members), when in fact, they may overestimate the dangers due to a lack of awareness of tools such as parental control mechanisms. The two broadband providers do not have a consistent approach to treatment of inappropriate content, which is not helping to quell these safety concerns.

3.2.4 Supply-side barriers: content, services and an enabling environment

While supply-side barriers are partly driven by the demand-side barriers identified above, the range of services, and the environment supporting the adoption of such services, remain limited. These barriers include:

A shortage of robust and reliable corporate broadband services: while the inadequacy of corporate services on offer can be largely attributed to the lack of competition, the limited portfolio and quality of managed solutions affects the appeal of Qatar as a destination for setting up business. Additionally, a lack of adequate cyber security services poses economic and social risks to the country, with threat mitigation or threat prevention services remaining expensive, especially for smaller enterprises. In the context of the increasing sophistication of cyber attacks, customer-side technology may be insufficient, due to either poor configuration or technically inferior devices.

Current initiatives to support local and Arabic language content lack scale, limiting the opportunities for Qataris who want and would use more local language services.

A still limited range of broadband-enabled public and private services:

- Qatar's e-government "Hukoomi" services have witnessed a broad increase in adoption, but are still not in use by the majority of the population. While this lack of usage does not presently impact broadband take-up (currently, such services do not require a particularly large amount of bandwidth), it is likely to lessen the demand for more complex and demanding future transactional services. The current reliance on paper for all sorts of administrative procedures by companies and individuals is inefficient, places an unnecessary strain on an already loaded public sector and has a negative impact on the quality of life of citizens and residents.
- E-health and e-education initiatives are still in the planning phase.
- Environmentally oriented applications supported by broadband infrastructure are being piloted, and have the opportunity to significantly reduce the increasing environmental pressure on Doha and Qatar as a whole.
- E-commerce is still in a nascent phase, facing operational obstacles preventing its spread in the form of a lack of postal-code enforcement and the unavailability of affordable e-payment solutions.

A significant uncertainty surrounding the legal environment affecting intellectual property protection, privacy and freedom of expression.

- Current legislation does not provide sufficient safeguards for the protection of digital content, discouraging both local and international media-producing or media-dependent organizations from creating and hosting digital content in Qatar. This in turn negatively affects Qatar's

appeal to such entities.

» Fragmented privacy legislation does not safeguard the protection of individuals' information online. The absence of a clear policy on the handling of private data by third parties (whether public or private bodies) is a concern for certain segments of society, negatively affecting their take-up of broadband services. This right to privacy is a fundamental prerequisite to the right to freedom of expression, the latter being in turn a key requirement for creativity through the development and exchange of ideas.

» There is a lack of clear media regulations, which due to the current uncertainty surrounding freedom of expression, is affecting content production through the application of self-censorship.

Social and cultural norms are preventing the emergence of an entrepreneurial segment, especially among the Qatari population, who prefer the security offered by traditional jobs. While some public initiatives seek to address this through their support for digital entrepreneurs, their limited number cannot make them the sole facilitator of start-up development in the country.

A number of cyber security policies have been and continue to be implemented by Qatar, such as the Government Information Assurance Policy (providing the necessary foundation and relevant tools to government institutions in order for them to implement adequate information security management systems), which fits within the National Information Assurance framework; the National ICS security standard (providing the minimum controls that need to be incorporated or addressed for any industrial control system that is critical to Qatar); or the Banking Supervision Rules issued by the Central Bank of Qatar, which is a handbook of cyber security rules to be followed by banks. What is now required, however, is a comprehensive cyber security strategy, to ensure common measures are applied to Qatar's corporations in terms of cyber defense. As each company currently follows independent policies, Qatar is only as safe as the weakest interconnected link in its territory. Sufficient security to Qatar's vital infrastructure can also be improved by physically connecting all critical government agencies redundantly, to avoid the existence of single points of failure that could have damaging consequences to government continuity in the event of a natural disaster, an outage or a physical or cyber attack. ■

4

Action Area 1:

Supporting Healthy Competition

Competition is a vital driver of consumer welfare: it lowers consumer prices, improves the quality of service, contributes to the emergence of new and innovative services and increases take-up, while providing higher levels of customer satisfaction. Qatar will continue its ongoing efforts toward the liberalization of the broadband market across all key areas of the broadband value chain, with the aim of improving competition.

Broadly, competition in the broadband market can be encouraged in two forms:

- Infrastructure-based competition, where each service provider owns its physical network infrastructure and competes at that level.
- Service-based competition, where the service provider relies on an existing open network infrastructure of a third party (either just the passive layer, or both the passive and active layers), with competition occurring at the service level (price, products, services).

Broadband competition will be established in Qatar when consumers have the ability to choose between a minimum of two competing operators for their broadband requirements. As fixed and mobile technologies do not offer equivalent service, choice will be provided across both technologies: in any given location (with the exception of rural areas, which are likely to require a subsidized rollout), consumers will be able to choose between two fixed and two mobile service providers. After introducing mobile number portability in February 2013, fixed number portability will have to follow suit shortly in order to improve the competitive situation.

Objectives

- An effective competitive environment for the provision of broadband services in Qatar, ensuring a real choice for consumers and businesses, for both mobile and fixed networks, irrespective of geography.
- A regulatory framework that enables sustainable competition.
- A regulator that is independent and empowered with the ability to enforce its decisions.

It is essential that the deployment of telecom infrastructure in Qatar's existing and new real estate developments ensure the establishment of fair competition by deploying passive infrastructure that enables open-sharing. Among other things, this will imply the need to ensure a single standard approach to the in-building fiber deployment currently being conducted by Ooredoo, Qnbn and real estate developers, ultimately guaranteeing broadband provider choice for end users.

To further promote competition in the fixed market, the broadband provisioning market will eventually be opened to additional entrants in the form of Internet service providers (ISPs). As it is not envisaged that ISPs will be willing to compete at the passive infrastructure layer (due to the expensive active equipment requirements to "light" the fiber), access to the service layer of existing operators' networks will need to be provided on a non-discriminatory and transparent basis. However, it will be crucial to provide such an access at the right moment, after ensuring that the expected demand can be addressed by a sufficient capacity in the underlying physical infrastructure.

Ensuring this access provisioning, as well as the other initiatives to promote competition, will require empowering Qatar's telecommunications regulatory authority to enforce its decisions and to be independent from other government institutions, so that its decisions can be controlled and appealed.

Establishing true competition for broadband provisioning will greatly facilitate the emergence of competition for other retail services relying on broadband and offered by third parties, such as cloud services, disaster recovery or a range of other data center services, some of which are already offered in the market by either the incumbent or independent operators. To stimulate the deployment of such third-party services and enable their adoption, an adapted regulatory framework will be ensured.

Required policy actions

The tables below list the policy actions that will be implemented to promote competition in the provision of broadband services.

POLICY ACTION 1.1

Develop a suite of appropriate regulatory interventions to enable legal and regulatory enforcement: the Regulatory Authority is to be given power to apply reasonable sanctioning tools and fines, ensuring the enforcement of regulatory decisions in a transparent manner, without having to resort to public prosecution.

Rationale	Stakeholder involvement[3]	Policy target
» Accelerate competition by ensuring faster compliance with regulatory decisions	» MICT (Regulatory Authority) – R, A » Ooredoo, Vodafone, Qnbn – C	» 2014

POLICY ACTION 1.2

Create an independent appeals commission related to regulatory decisions, with a corresponding appeals process that ensures fairness to the appealing party, in line with the Qatari legal framework in place.

Rationale	Stakeholder involvement	Policy target
» Ensure accountability and fairness of regulatory decisions	» Ministry of Information and Communications Technology – A » Ministry of Justice – R » Ooredoo, Vodafone, Qnbn – C	» 2014

3 R: Responsible; A: Accountable; C: Consulted; I: Informed

POLICY ACTION 1.3

The Regulatory Authority is to become independent of the MICT.

Rationale	Stakeholder involvement	Policy target
» Improve credibility, legitimacy and effectiveness, eliminate conflicts of interest	» Ministry of Information and Communications Technology – R, A » Ooredoo, Vodafone, Qnbn – I	» 2014

POLICY ACTION 1.4

Ensure regulatory framework is conducive to competition:

» Define the core elements of a new wholesale access regulatory framework once competition is well established between the two licensed fixed service operators

» Continue monitoring market in preparation of introducing further competition in a timely manner, in fixed and eventually mobile services

Rationale	Stakeholder involvement	Policy target
» Support investment and innovation through lowering barriers to ISPs' entrance	» MICT (Regulatory Authority) – R, A » Ooredoo, Vodafone, Qnbn – C	» Wholesale access framework in place by 2015

POLICY ACTION 1.5

Act to ensure adequate quality of service (QoS):

a. Redefine a set of QoS metrics to measure performance of fiber-based services

b. Publish retail QoS metrics (fixed and mobile)

Rationale	Stakeholder involvement	Policy target
» Creates incentives for operators » Provides transparency for users	a. MICT (Regulatory Authority) – R, A Ooredoo, Vodafone, Qnbn – C b. MICT (Consumer Affairs Department) – R, A Ooredoo, Vodafone, Qnbn – I	» 2014

POLICY ACTION 1.6

Clarify, and develop where necessary, current broadband ancillary services covered under existing class licenses.

Rationale	Stakeholder involvement	Policy target
» Help determine if retail competition could be enhanced with a simpler licensing procedure or the absence thereof altogether » Clarify situation to potential entrants	» MICT (Regulatory Authority) – R, A » Ooredoo, Vodafone, Qnbn – C	» 2014

POLICY ACTION 1.7

Define and make mandatory technical specifications standard for fiber rollout that ensure the potential for open, equal, non-discriminatory and viable access to the fiber infrastructure inside buildings (in-building cabling).

Rationale	Stakeholder involvement	Policy target
» Promote ease of provider choice for end users	» MICT (Regulatory Authority) – R, A » Ooredoo, Vodafone, Qnbn – C » Real estate developers – C	» 2014

POLICY ACTION 1.8

Introduce fixed number portability in the market.

Rationale	Stakeholder involvement	Policy target
» Remove barriers to fixed service provider switch	» MICT (Regulatory Authority) – R, A » Ooredoo, Vodafone – C	» 2014

5

Action Area 2:

Efficient Management of Resources

The resources used in telecom networks include tangible assets (e.g., towers, ducts, central offices, copper lines and dark fiber), and intangible assets (e.g., spectrum, international bandwidth, etc.). Access to these assets is vital for telecom service providers, whether these are controlled or owned by private or public institutions.

Fiber networks, which are capable of providing near-limitless capacity, offer the most future-proof approach to meeting broadband demand over the long term, not only for fixed services, but also for mobile backhaul.

Advances in the capabilities of the passive fiber optic, and more importantly in the active electronics, have ensured that additional capacity can be added at relatively low incremental cost. This trend is set to continue, as the limitations to fiber capacity (driven by modulation techniques, architectural choices and performance constraints of networking equipment) will continue to be overcome through new innovations in active equipment. In the very long term, upgraded fiber may still be required.

It is in the interest of all to ensure that the cost and speed of the rollout of both fixed and mobile telecom infrastructures is optimized.

The current parallel deployment of two fiber networks by Qnbn and Ooredoo does not represent an efficient or sustainable investment. Ultimately, and similar to models adopted in leading broadband economies, preference will be given to the establishment of a single provider of passive infrastructure providing indiscriminate and open access to the licensed service providers. Under such a scenario, Ooredoo and Qnbn will need to reach a commercial agreement under which their fiber networks are consolidated. In the meantime, it will be ensured that Qnbn maximizes its use of existing passive infrastructure (such as ducts and central offices) through access agreements that are governed under commercial conditions, which ensure that Qnbn's passive service offer remains competitive—failing which, true competition will not be established in the fixed telecom market.

Objectives

- Strive to minimize infrastructure duplication.
- Ensure ready access to ducts and land sites, especially for fiber deployment and upgrades and cell site construction.
- Encourage acceleration of migration to fiber, targeting a rapid switch-off of the copper network.
- Develop a spectrum release and allocation plan to maximize the efficient use of the electro-magnetic spectrum and provide clarity to the market.
- Ensure that the mechanisms to rapidly offer improved network capacity and coverage are in place to address the needs and expectations of residents and visitors.
- Ensure sufficient international bandwidth is made available to Qatar's private and public institutions.

Regardless of the outcome of such a consolidation, inefficiencies surrounding access to rights of way will be addressed to optimize the cost of infrastructure deployment and minimize disruption. This will entail maximizing the use of existing assets and facilitating service providers' access to them. A first step in this direction will be to clarify asset ownership, in particular the disputed ducts in the trunk network, and making information pertaining to these assets and their ownership available to all requesting parties. Clear conditions will be put in place to ensure coordination with public works

authorities and real estate developers, while the permit acquisition process from municipalities will be transparent and standardized for all parties. In particular, it will be essential for fiber deployments to be closely coordinated with the Ministry of Municipalities and Urban Planning, in the light of the significant number of megaprojects under development in Qatar. Close coordination with the ministry in question will also be essential for the efficient sharing of ducts and corridors.

In 2022, it will be essential to provide fixed fiber connectivity to the planned stadiums that will host the FIFA World Cup matches, which will be geographically distributed across Qatar. Connectivity requirements will be driven by the needs of:

- the global media, requiring high-capacity circuits, high reliability and redundancy, and low latency
- spectators, who will be mostly mobile, but will require highly available, reliable fixed backhaul to support mobile services as they record the events and interact with friends and family back home

The usage of mobile services is anticipated to increase significantly as the capability of networks and devices improves, prices fall and new innovative services become available. However, although technological progress in wireless and cellular technology is set to continue, the GSMA predicts that many GCC states, including Qatar, could face spectrum shortfalls in urban areas by 2020 if they do not heavily invest in deploying additional mobile network infrastructure. Irrespective of the technologies that emerge, Qatar will carefully manage the underlying spectrum resources enabling future mobile services. The completion of the digital switchover plan in 2012 is a significant step toward maximizing the potential for the delivery of true broadband speeds through mobile technology, unlocking the mobile broadband future—and with it, significant economic welfare. Regional coordination and compliance with ITU rules and regulations will be critical to ensure harmonization, with unilateral actions by national regulators likely to be counterproductive. High-quality mobile networks will be particularly crucial for the 2022 World Cup, when hundreds of thousands of visitors will converge on Qatar, in particular in stadium areas with high mobile traffic densities. As cellular traffic offload to Wi-Fi is expected to continue growing, it will also be essential to track wireless technology developments to inform sound policy judgments on spectrum management. Finally, spectrum management will necessarily include satellite technology, which will play an important role in providing backup connectivity, reaching regional neighbors and terrestrial operators will be essential to maximize spectral efficiency.

As demand for mobile services grows, additional coverage and capacity sites will have to be deployed. This will require ensuring the smooth and timely interconnection of mobile and fixed networks, as well as simplifying the complex processes and negotiations involved in cell site acquisition (obtaining permits, completing land lease transactions, gaining authorizations from relevant authorities). It is essential that a transparent and standardized process is established and enforced for interconnection and site acquisition, setting delay limits and penalty clauses. To minimize the environmental and visual impact of mobile towers, minimize deployment costs and accelerate the mobile network rollout, an effort will be directed toward mandating a minimum level of tower sharing between mobile operators (at a passive infrastructure level).

With the transition to fiber networks, and particularly toward fiber to the premises, the need for copper will diminish. Copper networks were originally designed for the provision of switched voice services, and it is inefficient for operators to run fiber and copper networks in parallel. The eventual switch-off and de-commissioning of copper networks will be needed to ensure operator efficiency (with the exception of vital backup lines that will remain in service).

International capacity constraints will also be addressed, by considering the implications of a change in the regulatory framework toward open access, as well as launching an Internet exchange point (IXP). Countries without an IXP, including Qatar, are forced to route domestic Internet traffic onto long-distance international links, which can result in significantly higher costs for operators (which are passed on to consumers) and latency (which can result in poor customer experience). The presence of an IXP can also induce global content players to place caches locally in Qatar, which can increase the amount of locally distributed content.

The migration toward IPv6 currently under implementation across all government and large corporate organizations in Qatar, and which (aside from its other benefits) is set to improve routing and network packet processing efficiency, will need to be completed but also expanded to organizations of all sizes. Broadband subscribers' devices (customer premises equipment) will also need to comply with the IPv6 protocol.

Ultimately, the efficient management of resources will support the faster establishment of competition, and enable Qatar to open up future possibilities of innovation in application design and development that could support a strong virtuous cycle in driving both demand for, and supply of, additional bandwidth over the longer term.

Required policy actions

The tables below list the policy actions that will be implemented to ensure efficient resource management.

POLICY ACTION 2.1

Define and make mandatory technical specifications for fiber rollout that ensure open, equal, non-discriminatory and viable access to the fiber infrastructure, ensuring competition can be established on the passive infrastructure layer.

Rationale	Stakeholder involvement	Policy target
» Promote competition in new and existing developments » Improve efficiency of investment, promote ease of provider choice for end users » Provide flexibility to service providers seeking wholesale access	» MICT (Regulatory Authority) – R, A » Ooredoo, Vodafone, Qnbn – C » Ministry of Municipality and Urban Planning – C » Real estate developers – C » Ashghal – C	» 2013

POLICY ACTION 2.2

Develop standard terms and conditions for access to passive network infrastructure:

a. Resolve duct ownership issues through an appropriate and exhaustive investigation of their historical deployment

b. Make duct ownership and space availability information accessible to requesting parties on an appropriate mapping application, and maintain that information on a regular basis

c. Define clear conditions and policy for equal and non-discriminating access to infrastructure in view of ensuring efficient use; this should include access to ducts, corridors and land sites for mobile towers, with access agreements to be governed under commercial conditions that ensure the competitiveness of access seekers; this should also include a clear definition of the roles and responsibilities to be undertaken by each stakeholder involved in this process

Rationale	Stakeholder involvement	Policy target
» Accelerate and facilitate deployment of passive infrastructure	a. MICT (Regulatory Authority) – A Ooredoo – C Ashghal – R Ministry of Municipality and Urban Planning – R b. MICT (Regulatory Authority) – A Ooredoo, Vodafone, Qnbn – R Ashghal – R Ministry of Municipality and Urban Planning – R Kahramaa – R c. MICT (Regulatory Authority) – R, A Ooredoo, Vodafone, Qnbn – C Ministry of Municipality and Urban Planning – R Kahramaa – C	» All duct ownerships mapped and terms and conditions defined by the end of 2013 » Centralized and updated repository of asset information by 2014 » Standardized process for rights-of-way access by 2014

POLICY ACTION 2.3

Support negotiations between Ooredoo and Qnbn in view of the consolidation of their fiber infrastructure and define a strategy toward achieving it.

Rationale	Stakeholder involvement	Policy target
» Minimize infrastructure duplication » Set up appropriate conditions for future market entry	» MICT (Regulatory Authority) – A » Ooredoo, Qnbn – R » Vodafone – C » Ministry of Municipality and Urban Planning – C » Ashghal – C » Kahramaa – C	» Consolidation strategy in 2014

POLICY ACTION 2.4

Define mandatory instruments for the sharing of passive mobile tower infrastructure.

Rationale	Stakeholder involvement	Policy target
» Accelerate and facilitate deployment of mobile network infrastructure » Improve visual environment	» MICT (Regulatory Authority) – R, A » Ministry of Municipality and Urban Planning – C » Ooredoo, Vodafone – C	» Policy in place by beginning of 2015

POLICY ACTION 2.5

Consult with industry to define a roadmap for switch-off of the copper network.

Rationale	Stakeholder involvement	Policy target
» Improve efficiency	» MICT (Regulatory Authority) – A » Ooredoo – R » Ministry of Municipality and Urban Planning – C » Ashghal – C	» 2014 – consultation » 2016 – urban switch-off » 2020 – complete switch-off

POLICY ACTION 2.6

Develop a spectrum management and release plan, following the recommendations set out in MICT's Radio Spectrum Policy of April 2011:

» Establish the Qatar National Spectrum Coordination Committee (QNSCC)

» Develop a clear roadmap and process for the allocation of suitable spectrum (in terms of spectrum adopted by the international majority) and communicate this to the market:

- Identify public-sector holdings and uses, and coordinate with departments (e.g., interior, defense, transport)
- Identify demand for spectrum through a consultation process
- Coordinate spectrum use at a regional level (for roaming, avoidance of interference in borders)
- Conduct a cost–benefit analysis of bands that would meet the expected demand
- Identify release issues
- Define strategy for release

» Spectrum allocation to be coordinated with regional initiatives and ITU region 1 principles

» Spectrum management and release plan to be inclusive of spectrum for satellite and next-generation Wi-Fi

Rationale	Stakeholder involvement	Policy target
» Provide the market with greater visibility and maximize the economic value of spectrum	» MICT (Regulatory Authority) – R » Qatar National Spectrum Coordination Committee (QNSCC) – R, A » Ooredoo, Vodafone, Es'hailSat – C	» QNSCC established 2013 » 2014 – spectrum management and release plan

POLICY ACTION 2.7

Evaluate the need for a class license allowing international capacity operators (underwater and terrestrial cable operators, satellite operators) to, in a first phase, provide capacity directly to consumers inside Qatar seeking access to international capacity on a closed-user group basis, whereby access to the landing station and backhaul from the landing station to the third party's point of presence would be required:

» Regulatory Authority to review the functioning and state of supply of international capacity, and to apply any necessary remedies—this may include considering the liberalization of the international gateway market

Rationale	Stakeholder involvement	Policy target
» Address the limited international Internet bandwidth made available in Qatar	» MICT (Regulatory Authority) – R, A » Ooredoo, Vodafone – C » Cable operators – C	» 2014 – review

POLICY ACTION 2.8

Define the implementation plan for the establishment of an IXP in Qatar.

Rationale	Stakeholder involvement	Policy target
» Reduce international transit costs » Improve customer experience	» MICT (Regulatory Authority) – R, A » Ooredoo, Vodafone – I » Cable operators – I	» 2016 – IXP deployment

POLICY ACTION 2.9

Monitor compliance of service providers and critical organizations with IPv6 specifications, and ensure timely implementation of the standard. For service providers, this will include CPEs (conditional on IPv6 DNS availability).

Rationale	Stakeholder involvement	Policy target
» Reinforce Qatar's advancement in broadband technology » Ensure readiness for IPv6 offering among organizations as well as service carriers	» MICT (Regulatory Authority) – R, A » MICT (ICT GOVERNMENT) – R (for government) » Ooredoo, Vodafone – R (for private sector)	» 2015 – IPv6 compliance

6

Action Area 3:

Ensuring Broadband Take-up

Broadband is an undeniable social and economic enabler. It is in the interest of Qatar to ensure the broadest possible access to, and use of, broadband services, irrespective of geography or user segment. This entails tackling the identified barriers of digital literacy and affordability, but also providing a safe environment and the awareness of safety features to protect users from inappropriate content. It also entails encouraging the use of broadband-enabled applications through appropriate awareness-raising.

Fulfilling Qatar's ambition of becoming a knowledge-based economy will require high levels of digital literacy among its residents, failing which broadband participation will be compromised. Having a population that is sufficiently qualified will also contribute toward increasing foreign investment in Qatar, as international companies will be able to source their workforce locally. Skills are required at multiple levels: from basic access to information to more evolved technical skills enabling innovation in digital content production and storing technologies, network technologies and network management, cyber security and distributed computing, but also a range of skills that accompany these requirements—across science, engineering, mathematics, economics and law.

As a balance to the development of ICT skills that enable participation in the broadband ecosystem, it is essential for the population of Qatar to develop its responsibility in accessing, disseminating and creating digital content. With the power conveyed by broadband to individuals in creating and sharing any kind of content they want, the risk for voluntary or involuntary manipulation through the dissemination of wrong information is very real. This has been demonstrated through the proliferation of social networks use, which has been accompanied by a dramatic increase in the production and sharing of user content, but not always with the necessary control and responsibility. Due to the transnational nature of such networks, it will be the responsibility of end users to adopt safe and morally acceptable behavior online. As such, Qatar's residents will be taught to assess the value and credibility of information sources, share information and create content according to accepted moral values, putting them in a position to develop their critical thinking capabilities and pass sound and informed judgment. At the same time, users of broadband and in particular parents will be made aware of the risks and safety guarantees when using broadband, and be provided with the right tools to create safety within their homes.

Objectives

- Ensure the necessary skills required to efficiently use broadband Internet and related applications are acquired in the mandatory educational curriculum.
- Ensure government employees become knowledgeable about ICT for the purpose of contributing to the development, use and promotion of e-government applications.
- Ensure immoral digital content does not enter Qatar, neither is produced nor encouraged.
- Prevent children in particular, and the population in general, from accessing and promoting immoral material.
- Ensure affordable basic broadband access for Qatar's population.
- Promote broadband adoption through incentives and awareness programs for both individuals and businesses.

Defining the moral values of a country hosting communities as culturally diverse as the ones present in Qatar is complex. What may be acceptable to one can be offensive to another, whether it is behavior, the use of vocabulary, appearance or the nature and language of digital content. Although the growth in the expatriate population has broadened the perspectives of Qataris on other cultures and lifestyles, it is also threatening traditional Qatari values based on Arabic culture and Islam. Ultimately, online behavior will have to be guided by responsibility and respect, and reflect the values of justice, benevolence, freedom, equality and high morals stipulated as the basis of Qatari society under article 18 of the Permanent Constitution of the State. *QNV 2030* specifies that education should contribute to a solid grounding in Qatari ethical and moral values. As such, it is only natural that the moral values referenced be based on Qatar's perspective. Ultimately, however, moral values are rooted in common humanity and form a common basis across cultures, to the extent that there is a broad consensus on what these moral values should be. Trustworthiness, justice, family, religious tolerance and honesty are all examples of fundamental values that surpass our cultural differences. Such values will be preserved as broadband adoption increases.

Digital literacy

Digital literacy is defined as having the knowledge and critical understanding to engage in online opportunities through the safe use of information and communications technologies. This includes awareness of cyber safety risks and how they can be minimized, the ability to critically judge content accessed online and an awareness of one's responsibility regarding the dissemination and creation of data online.

In addition to ensuring an adequate level of digital literacy, the adoption of broadband services also requires appropriately priced products. Recognizing that access to broadband is an essential element of social inclusion, universal access to basic broadband (8 Mbps download and 4 Mbps upload) will be ensured for all residents, including the transient labor force. Currently, affordability remains a barrier to adoption. The objective is to ensure that all residents who are not part of the 95 percent benefiting from the ability to access 100 Mbps connectivity targeted for 2016 be guaranteed basic broadband services irrespective of their location and financial capabilities. In rural areas, this is likely to involve the use of cellular or satellite technology.

Required policy actions

The tables below list the policy actions that will be implemented to ensure the broadest possible access to broadband.

POLICY ACTION 3.1

Further enhance capacity to conduct digital literacy programs for the mainstream population, including:

» Empowering and capacity-building of Qatari women in the use of ICT technologies, by recruiting and training female trainers with the necessary cultural understanding

» Providing guidance to Qatari youth on the efficient use of ICT

» Raising awareness and teaching basic usage of ICT to senior citizens

Rationale	Stakeholder involvement	Policy target
» Digital literacy	» MICT (Digital Inclusion) – R, A » MICT (ICT & Society) – R » Ministry of Youth and Sports – R	» Ongoing, with a target of full digital literacy of Qatari population by 2016

POLICY ACTION 3.2

Maximize digital literacy of Qatar's mainstream population:

a. Introduce a mandatory digital literacy curriculum in the secondary national education system

b. Ensure digital literacy is taught to all public government employees

The curriculum will be reviewed and updated annually, to ensure taught material remains relevant in the light of the constant evolution of technology.

Rationale	Stakeholder involvement	Policy target
» Create a generation of IT-ready individuals, who can seize the opportunities offered by broadband	a. Supreme Education Council – R, A MICT (Digital Inclusion) – R DCMF, Qatar Foundation – C b. Government Ministries – R, A MICT (Digital Inclusion) – R DCMF, Qatar Foundation – C	a. 2018 – digital literacy curriculum in secondary education b. 2017 – training program for all government employees

POLICY ACTION 3.3

Promote e-government services among consumers and industry:

a. Develop incentives for the use of e-government services among the general public

b. Expand the requirements for e-government service use by corporations, making it mandatory for companies with more than five employees, as opposed to the current limit of 15 employees

c. Ensure equitable access to e-government services across providers, in particular short code access

Rationale	Stakeholder involvement	Policy target
» Stimulate usage of e-government services, contributing to driving broadband adoption	a. MICT (ICT GOVERNMENT) – R, A Ooredoo, Vodafone – C All government ministries – C b. Ministry of Economy and Trade – R, A Enterprise Qatar – C Chamber of Commerce and Industry – C c. MICT (Regulatory Authority) – A Ooredoo, Vodafone – R	a. Widespread adoption of e-government services by broadband subscribers b. Compulsory use of e-government services for companies with more than five employees by 2016 c. Equitable access to short codes for mobile operators in 2013

POLICY ACTION 3.4

Consult with industry to determine what the requirements are to achieve rural coverage using cellular or satellite technology. As a first step, areas unlikely to be addressed by fiber networks will be identified.

Rationale	Stakeholder involvement	Policy target
» Affordable ubiquitous access	» MICT (Regulatory Authority) – R, A » Ooredoo, Vodafone, Es'hailSat – C » QNSCC – C	» 2014 – consultation and feasibility study

POLICY ACTION 3.5

Develop mechanism and amount necessary to subsidize universal access to broadband in rural areas among the low-income population, as well as subsidizing broadband access in labor camps.

Rationale	Stakeholder involvement	Policy target
» Promote connectivity to the underprivileged segments of the population » Contribute to satisfaction of a key segment involved in Qatar's infrastructure development	» MICT (Regulatory Authority) – R, A » MICT (Digital inclusion) – C » Ooredoo, Vodafone, Qnbn – R » Es'hailSat – R	» 100% coverage with 8 Mbps by 2016 in labor camps

POLICY ACTION 3.6

Standardize the policy for limiting access to inappropriate content (safe-browsing policy), and implement and maintain consistent policy irrespective of hardware or software-filtering vendors. The policy is to be updated on a regular basis.

Rationale	Stakeholder involvement	Policy target
» Adopt a consistent policy to increase end user trust	» NCIS – R, A » Es'hailSat – R	» 2015

POLICY ACTION 3.7

Plan and conduct an awareness and education campaign to parents on the risks involved with unmonitored Internet use by children and the remedies to prevent it:

» Type of content available and ease of access to it

» Existing mechanisms to restrict access

Rationale	Stakeholder involvement	Policy target
» Prevent Qatari values from being negatively affected by broadband development and preserve children's safety	» MICT (Digital Inclusion) – R, A » CS/Q-Cert – C » Supreme Education Council – R	» 2014 – plan » Ongoing campaign thereafter

POLICY ACTION 3.8

Continue raising ICT awareness among residential and business users with a particular focus on SMEs:

» Conduct assessment of broadband usage by SMEs and identify priority SME segments that stand to benefit most from broadband-enabled applications such as cloud services

» Produce awareness materials to distribute, highlighting the benefits brought by media presence, cloud services and Internet marketing and communication

Rationale	Stakeholder involvement	Policy target
» Increase broadband take-up and improve economic benefits	» MICT (ICT Industry Development) – R, A	» 2013, ongoing campaign thereafter

7

Action Area 4:

Maximizing Broadband Benefits

The initiatives included in the fourth action area relate to the supply-side of services and content as well as the establishment of a favorable environment to further maximize the benefits brought by broadband. This includes promoting investment and innovation in broadband, ensuring Qatar stays at the forefront of ICT and generally increasing broadband-enabled opportunities. Taken together, these form the basis for the broadband ecosystem to flourish.

While infrastructure provides the founding structure for the digital economy, it is the range of services and applications available that ultimately creates the demand for broadband access. As such, Qatar will have to offer a range of broadband-enabled services proven to stimulate this demand but also to contribute to the social well-being of its residents.

To ensure Qatar's appeal to the corporate market, addressing the issues surrounding the quality, reliability and price of broadband connectivity services will be a priority. In particular, it is vital that the present and future needs of the enterprise segment be addressed, through adapted broadband connectivity products and cyber security features that follow the latest technology specifications. These services will have to match or surpass those available in the surrounding GCC markets.

The increase in digital literacy will be accompanied by an increasing trust in the Internet. Qatar will take full advantage of this development, and ensure that a growing number of e-government services become available to its citizens and residents: the focus will be to grow the availability of transactional services at all ministerial levels, enabling the population to conduct a number of administrative procedures from their homes (e.g., document attestations, issuance of birth, marriage and death certificates, residency visa renewals, notary act legalizations, requests for police certificates, etc.), reducing the strain on the public administration and increasing its efficiency. Such services will also improve process transparency to its users and speed of applications, ensure fairness and enable cost savings. To make such services and their use a reality will require an effective electronics record management policy, which guarantees their authenticity and integrity in order for them to have the same legal admissibility as their paper equivalents. The policy will further have to reflect the need for interoperability between different management systems in place (e.g., in the areas of health and

Objectives

- Ensure broadband services are regionally competitive.
- Promote the development and offering of locally relevant broadband services and content that meet the needs and expectations of all (consumers, corporations and government), including in the fields of health, education and research.
- Ensure a robust cyber security policy is applied across all industries in Qatar.
- Ensure aspiring ICT entrepreneurs have the support they need to develop their ideas.
- Expand and promote the use of smart technology in all households and businesses to reduce Qatar's carbon footprint, while leveraging the telecommuting opportunities brought by broadband.
- Ensure an adapted legal framework for data privacy and intellectual property protection.
- Adhere to net-neutrality principles subject to the preservation of moral values.

education as illustrated in the following paragraph) in order to enable the sharing of such records across different organizations.

The well-being of Qatar's residents will start with improved access to health and education. The provisioning of a world-class healthcare system features prominently in *Qatar National Vision 2030*, and the Supreme Council of Health has initiated reforms toward this objective, with a number of initiatives in place to implement the programs in Qatar's national health strategy.[4] With a fast-growing population, the capacity expansion of medical institutions is critical, from hospitals to clinics to private practitioners, and is being actively developed. As Qnbn and Ooredoo continue expanding Qatar's fiber coverage, the growing network of medical institutions will be able to benefit from high-speed broadband connectivity, which will form the basic infrastructure required for the development of e-health applications, enabling the exchange of patients' digital health records among healthcare stakeholders and practitioners, and promoting telemedicine. Containing the patient's complete medical history, digital health records will eventually enable practitioners to access this information irrespective of their location, reducing the strain on central medical institutions, and improving the accuracy of diagnoses. High-capacity networks will enable high-definition image sharing and video streaming for remote diagnosis, particularly needed in rural areas.

The definition and implementation of an e-health program in Qatar should be initiated without delay, in parallel with the launch of next-generation hospital services that are being designed by the Sidra Medical and Research Centre and the Hamad Medical Corporation. To ensure the program moves ahead rapidly, a strong political mandate is required, setting a clear governance model and identifying all areas of cooperation among Qatar's various healthcare stakeholders. This will include clarifying the legal context of data privacy, assigning responsibilities, defining standards (e.g., centralized vs. decentralized model for data access, format of health records, content of information stored, electronic archiving), ensuring compliance mechanisms are in place, and selecting adapted health data processing and ICT solutions that provide security and privacy guarantees for the patients.

Education also stands to benefit from broadband. More opportunities for online learning will break the barriers preventing access to education and enable new population segments to benefit, irrespective of their location, financial means, interests or disabilities. This will entail the need to encourage education institutions not only to be connected to high speed broadband, but as importantly to make digital content available online. Broadband will also facilitate the exchange of research data, in the context of an increasing focus by Qatar on raising its research and development profile. The recently published *Qatar National Research Strategy*[5] calls for establishing Qatar as an international center for R&D excellence, while Qatar University is preparing the launch of its Research and Education Network (REN), which aims to interconnect academic institutions and research organizations nationally and internationally. Higher education and research institutions' broadband requirements go beyond commercial Internet technology and will have to be catered to specifically.

4 Supreme Council of Health, *National Health Strategy 2011–2016,* June 2011. Accessible at: http://www.qu.edu.qa/pharmacy/components/upcoming_events_material/Qatar_National_Health_Strategy.pdf

5 Qatar Foundation, *Qatar National Research Strategy 2012*, October 2012. Accessible at: http://www.qf-research-division.org/QNRS_2012.pdf

Qatar is determined to fulfill its environmental responsibility toward both its residents and the world. The combination of a harsh climate, a rapidly growing population and a large oil and gas industry has placed the country at the top of the global carbon footprint list on a per-capita basis, placing an increasing strain on the environment in the years to come. Broadband stands to play a significant role in environmental sustainability, through a number of applications including, but not limited to:

- facilitating the remote management of appliances in homes and offices through sensor networks
- enabling smart water management through smart grids
- enabling environmental monitoring
- reducing emissions from transportation through an increased use of teleconference facilities
- optimizing transit routes through traffic monitoring and intelligent transport systems
- enabling telecommuting

Net Neutrality

Net neutrality calls for the absence of any discrimination or blocking of Internet content, user, platform or protocol. While adhering to net neutrality principles is important for Qatar's residents, the imperatives of preserving moral values to maintain the cohesion of Qatar's society imply the need for some form of content discrimination. Traffic-management techniques for network efficiency reasons should also be permitted provided such techniques do not disadvantage some users over others.

Such applications will fit within the larger framework of "smart-cities," which include sustainable urbanization initiatives going beyond broadband (e.g., sustainable construction of new buildings, localized power generation, energy storage, etc.).

Besides digital services, digital content represents a fundamental driver of broadband, whether accessed for informational, educational or entertainment purposes. Local content creation should be stimulated for two reasons:

Addressing the specific needs of the Qatari population: whereas content for the expatriate population is globally available, content tailored to the needs of Qataris is very limited.

Digital content creation and hosting will contribute to the development of the country's broadband ecosystem, and position Qatar as a digital content player in the region.

Empowering Qatar's citizens to be responsible contributors of online content, as recommended in the preceding chapter, will to an extent address the gap in relevant content. Another key contribution will come from the ongoing digitization of national and regional documents, audio and video analog materials and artifacts, following the policies, standards and guidelines published by MICT, which will ensure the preservation of the Qatari heritage for future generations. The digitized material will be made openly available online in 2014, increasing the knowledge of Qatar's history, culture and heritage among its citizens. The resulting digital content will also fill the major gap of available local material in digital form for entrepreneurs to generate secondary digital content such as e-books and content-rich websites, as well as support local software-application development, contributing to the generation of locally and culturally relevant content and services. Finally, it will be beneficial to explore how a public broadcaster in Qatar can contribute to creating relevant content and making it accessible online, in the model followed by the BBC in the United Kingdom.

The increased adoption of broadband will provide an opportunity for the adoption of e-commerce by Qatar's retailers and tertiary service providers. The current value proposition in this domain remains limited, despite a growing retail opportunity within Qatar and the MENA region. E-commerce will allow smaller companies to seize an opportunity of scale and reach they are deprived of in the physical trading market. For this to be successful, a number of measures will be addressed in priority order, including providing more certainty surrounding the enforcement of the e-commerce law, enforcing compliance and consumer protection laws, making available affordable e-payment options within Qatar, and implementing and enforcing a nationwide postal address system.

Stimulating digital content creation and hosting will require addressing the issues of intellectual property and privacy. These concepts will have to balance the needs of copyright holders with the benefits of openness and the protection of individual users. Consumer education, mentioned in the preceding chapter, partially addresses this, communicating to users that the respect of IP rights is in the interest of all, and in particular in the interest of creativity. While ensuring privacy is the responsibility of the individual and not the government, the latter will be required to ensure that users are able to control their own information on Qatar-hosted domains. This will also require that Internet service providers take an active role, and, as has been recently demonstrated in other countries, they can shun their responsibility toward users' rights and freedoms. To truly stimulate content creation and hosting within Qatar, appropriate author and intellectual property protection laws will be put in place and enforced. A media law is also required, clearly defining what material is tolerated for publication online as much as in print, yet respecting the need for freedom of opinion and expression.

Maximizing broadband benefits will also entail ensuring the cyber security of the country and its broadband users. Geopolitical tensions and Qatar's significant involvement in regional affairs are increasing the threat of cyber attacks on the country. In parallel, the growing reliance of Qatar on e-government services to serve its population will make the need for security more essential. Infrastructure critical to Qatar's security and economic and social welfare includes the national industry leaders in energy, finance, telecommunications and transport, as well as vital government information systems and public institutions. The spread of interconnected networks, facilitated by broadband, increases the vulnerability of this infrastructure, and a cyber attack affecting this infrastructure could have far-reaching consequences. Creating a favorable environment where all can benefit from a trusted range of broadband services therefore requires that this critical infrastructure be secured across multiple layers. A dedicated communications network that is physically separate and not connected to the Internet would be the ultimate protection, but this is unlikely to be workable for many organizations as most rely on the Internet for some aspects of their business. Hence, protection will be applied at higher layers in the network (i.e., not at the physical layer), by ensuring protection against a multitude of possible threats, such as distributed denial of service (DDoS) attacks, which have increased in number and sophistication and have affected the day-to-day operations of businesses in Qatar.

With the expansion of ICT skills among individuals, creativity and innovation will trigger increasing entrepreneurial aspirations requiring adequate support. These individuals, and in particular the younger population with limited financial means, will be given a supporting environment to start and develop their own businesses.

Finally, the proliferation of digital services and content will take into account the ever-increasing reality of convergence, as ubiquitous and multiplatform broadband access blurs the lines between telecommunications, media and broadcasting. As the telecom landscape changes globally, the

convergence of networks, services and devices, with new Internet-based players, will attack traditional markets such as TV and voice, enabled by new technologies. Regulators will need the necessary tools to ensure that they can fulfill their duties in light of these changes. The proliferation of M2M communication in a multitude of areas, the increased availability and use of location information and the development of cloud storage are only some of the examples that will drive the functionality of future services. These services will also be adapted to the needs of Qatar's residents, to their culture, values and expectations.

Required policy actions

The tables below list the policy actions that will be implemented to maximize broadband benefits.

POLICY ACTION 4.1

Continuously monitor Qatar's competitiveness in corporate broadband services:

a. Identify service needs against gaps in service offering

b. Conduct a pricing benchmark of a basket of corporate broadband service prices in the GCC to understand the competitive disadvantage of Qatar versus its neighbors

Rationale	Stakeholder involvement	Policy target
» Create a regionally competitive environment for the establishment of international companies in Qatar	a. MICT (ICT Industry Development) – R, A Ooredoo, Vodafone, Qnbn – I b. MICT (Regulatory Authority) – A MICT (ICT Trends & Indicators) – R Ooredoo, Vodafone, Qnbn – I	» Ongoing effort

POLICY ACTION 4.2

Remove legal barriers to the implementation of integrated e-service solutions, including data-sharing services across government agencies (e.g., e-health and e-education), e-commerce and digital content hosting.

» Data privacy:

- Review the legal framework surrounding digital data protection, and pertaining to the prevention of misuse of personal information
- If required, amend draft privacy law with necessary policy measures for data sharing and data protection related to e-services
- Ensure data privacy law is rapidly passed

» Media regulation:

- Further investigate the need for an amendment to existing author protection laws, penalizing copyright infringements
- Determine how the requirements for copyright infringement protection (e.g., user tracing and monitoring) can be balanced against the need for user data privacy
- Propose a new approach to media regulation that promotes freedom of expression and transparency of information, while ensuring that the national security of Qatar is not compromised
- Ensure media law is rapidly passed

Rationale	Stakeholder involvement	Policy target
» Promote digital content creation and hosting in Qatar » Facilitate implementation of e-health and e-education services	» Ministry of Justice – A » MICT (Strategic Planning) – R » MICT (Regulatory Authority) – R » MICT (CS/Q-Cert) – R » Ministry of Culture Arts and Heritage – R » DCMF – C » Supreme Council of Health – C » Supreme Education Council – C	» Data privacy law and media law ratified by the middle of 2014

POLICY ACTION 4.3

Lay the foundation for the expansion of e-government services by defining an integrated framework for the management of electronic records across all government entities:

» Review/define strategic plan

» Define characteristics of an electronic management solution

» Review/define implementation plan

Rationale	Stakeholder involvement	Policy target
» Improved government efficiency » Improved citizen and resident quality of life	» MICT (Strategic Planning) – A » Government Ministries – R » MICT (Regulatory Authority) – C	» Interoperable electronic record management system by 2015

POLICY ACTION 4.4

Address the impasse on Qatar's e-health strategy through a strong political mandate that will:

» Define a clear governance model

» Select stakeholders, assign their respective roles and responsibilities, and define areas of cooperation

» Define an e-health strategy that sets out a clear timetable for the implementation of e-health services in Qatar. Strategy should include an assessment of bandwidth needs by Qatar's various healthcare organizations

» Implement the strategy while coordinating the national fiber rollout to address the needs of all health organizations

Rationale	Stakeholder involvement	Policy target
» Improve quality of life » Launch innovative broadband-enabled services to stimulate take-up	» Supreme Council of Health – R, A » Hamad Medical Corporation – R » Sidra Medical and Research Centre – R » Qnbn – R » Qatar Assistive Technology Center (Mada) – C	» E-health strategy by 2014 » E-health services available by 2016, with e-health targets as they appear in Qatar's *National Health Strategy 2011–2016*

POLICY ACTION 4.5

Foster support for the development of online education and research and development:

» Ensure all education institutions (secondary and higher) and research institutions are connected to the fiber network

» Assess the feasibility of licensing digital education content and digitizing content from the national education curriculum

Rationale	Stakeholder involvement	Policy target
» Improve quality of life » Launch innovative broadband-enabled services to stimulate take-up	» Supreme Education Council – R, A » MICT (Digital Inclusion) – C » Qnbn – R » Universities consortium – R » Qatar Assistive Technology Center (Mada) – C	» All education institutions connected by 2015 » All primary, secondary and higher education material digitized by 2016

POLICY ACTION 4.6

Launch a set of e-government services adapted to transient laborers:

» Research services needed by transient labor population

» Make the relevant existing services available on feature phones (light-client- or USSD-based)

» Liaise with relevant public entities for the development of eventual new services

Rationale	Stakeholder involvement	Policy target
» Improve quality of life by facilitating administrative procedures	» MICT (Digital Inclusion) – R, A » MICT (ICT GOVERNMENT) – R	» Basic e-government applications available on feature phones by 2015

POLICY ACTION 4.7

Support the development and adoption of e-commerce platforms:

a. Conduct an e-commerce awareness drive targeting SMEs engaged in retail activities

b. Support the establishment of preferential loans for the development of e-commerce solutions for smaller businesses

c. Enforce the use of postal codes, starting with ensuring supporting legislation for enforcement in place

d. Price of existing and future e-payment solutions to be regulated by the government to make transaction costs competitive with international benchmarks, while allowing new non-bank payment initiatives to provide payment mechanisms to merchants and/or end users

Rationale	Stakeholder involvement	Policy target
» Improve Qatari business efficiency and reach	a. MICT (ICT Industry Development) – R Chamber of Commerce and Industry – R Enterprise Qatar – R Ministry of Economy and Trade – R b. Ministry of Economy and Trade – A Qatar Development Bank – R MICT (ICT Industry Development) – C c. MICT (Regulatory Authority) – A, R Qatar Post – R Ministry of Municipality and Urban Planning – R d. Qatar Central Bank – A MICT (Digital Incubation Center) – C MICT (ICT Industry Development) – C Qatar National Bank – C Doha Bank – C Commercial Bank – C	» 25% of SMEs involved in selling physical or digital goods and with more than 15 employees to offer an e-commerce platform by 2016 » Competitive e-payment gateway by 2015 » Nationwide postal address system by 2015

POLICY ACTION 4.8

Support information- and entertainment-oriented content creation:

a. Make online presence mandatory for all public government entities

b. Continue ongoing digitization efforts of national and regional media, culture and heritage

Rationale	Stakeholder involvement	Policy target
» Government transparency » Production of high-quality accessible content across multiple genres, expanding the digital inclusion of Qataris and expanding their cultural awareness	a. MICT (ICT GOVERNMENT) – A Ministry of Economy and Trade – R b. MICT (ICT Industry Development) – R, A Ministry of Culture, Arts and Heritage – R Qatar Foundation – R Qatar National Library – R MICT (ICT GOVERNMENT) – R Katara – R	» 100% of government entities to have a Web presence at a minimum in Arabic by 2015 » Open and free access to digitized archive in 2014

POLICY ACTION 4.9

Undertake a cross-sector strategic review to determine if a public-sector broadcaster could play a role in generating a new stream of regionally relevant content and making it available online.

Rationale	Stakeholder involvement	Policy target
» Create appealing and high-quality content to drive broadband usage	» MICT (ICT Industry Development) – R, A » Qatar Media Corporation (QMC) – R » Ministry of Culture Arts and Heritage – R » Qatar News Agency – R » DCMF – C	» 2015

POLICY ACTION 4.10

Developing ICT-based environmental programs, including initiatives that can contribute to the wider "smart cities" concept; these programs will be an integral part of a larger national green policy framework (to be developed through a separate government initiative):

» Foster consumer-driven partnerships, enabling information sharing between consumers and stakeholders (e.g., utility companies, real estate companies, Ministry of the Environment)

» Raise awareness about environmental sustainability, resource management and sustainability of the impact of ICT devices on the environment

» Define incentives that will encourage a change in consumer behavior, toward adopting low-carbon solutions

» Set targets for the penetration of smart-metering technology in households, and define the strategy to reach these targets

» Coordinate fiber deployments in the country with the deployment of smart meters, in order to use the infrastructure for the delivery of smart meter–related applications

Rationale	Stakeholder involvement	Policy target
» Make broadband contribute to the reduction of Qatar's carbon footprint	» Ministry of Environment – R, A » Ministry of Energy – R » Ministry of Transport – R » Ooredoo, Vodafone, Qnbn – R » Es'hailSat – R » Kahramaa – R	» 100% of households with smart meters and remote climate control by 2020

POLICY ACTION 4.11

Support the creation of an application developer ecosystem and organize application development competitions.

Rationale	Stakeholder involvement	Policy target
» Encourage entrepreneurship and ICT development	» MICT (Digital Incubation Center) – R, A » MICT (ICT Industry Development) – R » Ministry of Youth and Sports – R » Ooredoo, Vodafone – R » Universities consortium – R » Qatar Science and Technology Park – C » Qatar Computer Research Institute – C	» 2015 – first competitions

POLICY ACTION 4.12

Determine appropriateness and benefits for the market in expanding the Regulatory Authority's mandate regarding converged regulation:

» Lead a consultation phase with key stakeholders in the media and broadcasting industry to understand the best path toward converged regulation

» Set up a cooperative working framework with other institutions involved in the production and distribution of digital content, including leading newspapers and online portals

Rationale	Stakeholder involvement	Policy target
» Convergence of technology, media and platforms rendering single-sector regulation obsolete	» MICT (Strategic Planning) – A » MICT (Regulatory Authority) – R » Qatar Media Corporation – C » Ministry of Culture, Arts and Heritage – C » DCMF – C » Ooredoo, Vodafone, Qnbn – C	» 2015 – assessment » 2018 – converged regulator

POLICY ACTION 4.13

Reinforce Qatar's cyber security across multiple layers:

a. Draft a cyber security policy that includes but is not limited to:

- Country-wide cyber security directives to be implemented by all critical organizations and in particular service providers
- Strategic communications/awareness campaign designed to improve the awareness and advocacy for MICT's critical role in cyber security for the State of Qatar
- Identifying and confirming all critical infrastructure organizations, including critical dependencies and relationships, and the systems and services that require protection to provide focus to security planning
- Security workforce management by addressing staff gaps and training needs, and establishing a cyber security career track
- Provisions for random inspections of cyber resiliency mechanisms put in place as well as investigate and remove malware from critical infrastructure networks
- Implementation roadmap for driving cyber security strategy through implementation phases into delivery of operational capability for national cyber security
- Conducting independent assessments of organization adoption of the policies, standards and guidelines espoused by MICT
- Disaster recovery and business continuity plans to ensure that the work of government can continue with minimum disruption and damage in the event of a disaster
- Technology and application vetting to prevent information leakage from local networks/machines

b. Accelerate the resiliency of vital infrastructure:

- All government entities and critical organizations to be connected with redundant physical links, in particular data centers and disaster recovery sites
- Critical network infrastructure to enable log management and record traffic to recover instantly from breaches
- Network survivability–critical network infrastructures to manage network throughput to fulfill their mission in the presence of threats or technical disruption

Rationale	Stakeholder involvement	Policy target
» Protect Qatar » Reinforce resiliency and support establishment of businesses	a. MICT (CS/Q-Cert) – R, A Ooredoo, Vodafone – C b. MICT (ICT GOVERNMENT) – A Qnbn – R Government Ministries – C Ooredoo, Vodafone – I	a. 2013 – cyber security policy in place b. 2015 – redundant physical connectivity to critical national infrastructure

POLICY ACTION 4.14

Promote entrepreneurship in the field of ICT:

a. Expand current Qatar University entrepreneurship program to other universities and departments, and further develop ways to promote an entrepreneurial mind-set among fresh graduates

b. Leverage ICT investment opportunities identified by MICT for the Incubation Center, in addition to exploring and supporting other opportunities in the healthcare and education sectors

Rationale	Stakeholder involvement	Policy target
» Change the mind-set toward a more entrepreneurial spirit » Encourage innovation across broader range of sectors	a. Supreme Education Council – R, A Universities consortium – R MICT (Digital Incubation Center) – R b. MICT (ICT Industry Development) – R, A MICT (Digital Incubation Center) – R Qatar Science and Technology Park – C Qatar Development Bank – C Enterprise Qatar – C Ministry of Public Health – R Supreme Education Council – R Silatech – C	» Entrepreneurship programs in 2015 (Qatar University faculties) » Ongoing support for innovation in ICT

POLICY ACTION 4.15

Foster the establishment of a visible and active venture capital network in Qatar to further stimulate entrepreneurship and address financial considerations.

Rationale	Stakeholder involvement	Policy target
» Encourage and support start-ups	» MICT (ICT Industry Development) – C » MICT (Digital Incubation Center) – R, A » Qatar Development Bank – C » Universities consortium – C	» 2016 – venture capital network in place

8 Implementation

The targets set in the National Broadband Plan and the associated policy actions to meet those targets are very ambitious. It is therefore essential that stakeholders start acting immediately, and display sufficient commitment to successfully implement them. In addition, coordination among stakeholders is required, as is the constant tracking of progress made against the set targets. As the prominent stakeholder of this Plan, MICT will be heavily involved in its implementation.

Of course, a 10-year plan cannot be successful if it does not provide sufficient flexibility: technological progress, economic factors, regional dynamics, stakeholder capabilities and political change are just some of the unknown elements that will have a likely impact on the policy actions in this Plan.

The activities to be undertaken in order to ensure the successful implementation of the policy actions are:

1. MICT to set up a task force that will be responsible for coordination of the effort of all stakeholders, ensure progress in the Plan's implementation, monitor progress for the fulfillment of the initiatives throughout the Plan's lifetime and ensure targets are met. It is essential that:
    a. The task force is composed of a minimum of five members having the required broadband experience and local market knowledge across all areas that need to be addressed in this Plan. This task force will need a high-level understanding of the issues at stake, including but not limited to:
        - telecommunications and competition regulation
        - fixed and mobile broadband technology
        - social inclusion
        - education and health
        - privacy and intellectual property
        - cyber security
    b. The task force is approved by the majority of stakeholders involved in the implementation of the Plan.
    c. All stakeholders are accountable to the task force for the fulfillment of their tasks.
    d. The task force is empowered to make necessary decisions pertaining to the prioritization or eventual amendments of policy actions, and will benefit from direct support from the executive authority.

2. Form consortia or committees with stakeholders from the same industry, with common identified policy objectives:
    a. universities
    b. cable operators
    c. real estate developers
    d. QNSC
3. Set up cross-sectoral working groups, which will be responsible for carrying out the initiatives contained in the Plan:
    a. Each stakeholder to assign a broadband champion who will represent it and report to the task force.
    b. The working groups will be composed of the stakeholders' broadband champions who need to interact for the fulfillment of the relevant policy actions.
    c. The working groups will report on a regular basis to the task force, indicating achieved progress, identifying key bottlenecks and requesting eventual support. To ensure timely tracking, it is recommended that such reports occur on a monthly basis.
4. Stakeholders will be responsible for defining their own detailed implementation plans of the policy actions they need to fulfill. They will ensure that the plans address the relevant policy objectives to which the stakeholders have been assigned, and that they respect the set target deadlines. Each implementation plan will be validated with the task force. The task force will be responsible for ensuring feasibility and coordination among the different implementation plans.
5. Define tracking mechanisms to enable both the working groups and the task force to assess progress. This will entail:
    a. Validation of understanding of each stakeholder's responsibilities for each of the initiatives. In the event that initiatives have to be prioritized, reassigned or changed, this will need the approval of the supervisory committee.
    b. Breaking down the policy actions into a set of smaller actions by each stakeholder or cross-sector working group where necessary.
    c. Assigning implementation deadlines for these sub-actions, and validating them by the supervisory committee, taking into account the need to respect overarching targets included in the Plan.
    d. Tracking target achievements.

Appendix: Approach

The National Broadband Plan is the result of a detailed analysis of the Qatari broadband market, combined with stakeholder consultations and reference to regional and international benchmarks. The stakeholders were selected to provide a broad set of views and inputs, and included organizations from the private and public sectors, as well as civil society. The stakeholders consulted for the Plan are referenced in Figure 6.

Figure 6: Stakeholder consultations for the National Broadband Plan

EXTERNAL STAKEHOLDERS			INTERNAL STAKEHOLDERS (MICT AND AFFILIATED ENTITIES)
Al Jazeera	Qatar 2022 Supreme Committee	Vodafone	ICT Industry Development
Doha Centre for Media Freedom (DCMF)	Ministry of Municipality and Urban Planning	Intel	Digital Inclusion
Gulf Bridge International	Hamad Medical Corporation	CISCO	Digital Incubation Center
Northwestern University	Qatar Science and Technology Park	Melaha	ICT GOVERNMENT
Oryx GTL	Qatar Petroleum	SAMENA	CS/Q-Cert
Electricity & Water Co. (Kahramaa)	Qatar Tribune	Giza Systems	Regulatory Authority
Qatar Media Corporation	Qatar University	SES Broadband Services	Strategic planning
Supreme Council of Health	Qatari Diar	Education City	ICT & Society
Qatar Financial Authority	Qnbn		
Es'hailSat	Ooredoo		

Stakeholder interviews and desk-based research, as well as a wealth of information provided by MICT and other third parties, have led to the identification of the barriers to broadband proliferation. To address these barriers, a set of action areas have been defined, and for each action area a set of policy actions have been proposed. Finally, to ensure the timely and proper implementation of these initiatives, a control and monitoring mechanism is recommended, involving all relevant stakeholders for each of the policy actions. The structure of the broadband plan is illustrated in Figure 7.

Figure 7: Process followed for drafting the National Broadband Plan