

**Resolution No. (17) of the year 2020 Promulgating the Fifth National Telecommunications Plan**

**First Deputy Prime Minister:**

After perusal of,

Legislative Decree No. (48) of the year 2002 promulgating the Telecommunications Law, amended by Legislative Decree No. (38) of the year 2017, and particularly Article 15(a) thereof,

And based on the recommendation of the Minister of Transportation and Telecommunications, after his consultation with the Telecommunications Regulatory Authority,

And after approval of Cabinet,

Determines the following:

**The First Article**

The attached Fifth National Telecommunications Plan is approved and shall take effect for three years.

**The Second Article**

This Resolution and the attached plan shall be published in the Official Gazette, and the Minister of Transportation and Telecommunications shall monitor its implementation, and shall take effect on the day following its publication.

Salman Bin Hamad Al Khalifa

First Deputy Prime Minister

Issued on: 8 Rabi Al Awal 1442 H

25 October 2020

## **Fifth National Telecommunications Plan**

### **1 Introduction**

- 1 This National Telecommunications Plan (NTP) has been adopted by the Government of the Kingdom of Bahrain (Government) in conformity with Article 15 of the Telecommunications Law, as promulgated by Legislative Decree No. 48 of 2002 (Telecommunications Law), which requires the Minister responsible for the telecommunications industry to publish periodically a National Telecommunications Plan with the approval of the Council of Ministers and published in the Official Gazette. The published plan must encompass both the strategic plan for the sector and the general policy of Government toward the telecommunications sector.
- 2 This is the Fifth National Telecommunications Plan (Plan) to be issued since the promulgation of the Telecommunications Law. It sets out the Government's strategic plan and general policy for the telecommunications sector of the Kingdom, covering the three-year period commencing from the date of its publication.
- 3 The Telecommunications Law requires the Telecommunications Regulatory Authority (Authority) to act "in a manner that is consistent with the objectives of the National Plan for telecommunications; provided that this shall not be construed to derogate from the independence of the Authority in accordance with the provisions of this Law."
- 4 Accordingly, the provisions of this Plan that are described as Government Policy, together with the required actions, have the legal status defined in the Telecommunications Law.

## 2 Current State of the Telecommunications Sector in the Kingdom

- 5 Following nearly 20 years since the Kingdom's telecommunications sector was liberalised through the issuance of the Telecommunications Law and the licensing of new entrant operators to compete alongside of Bahrain Telecommunications Company BSC (Batelco), consumers in the Kingdom have benefitted significantly from improved access to telecommunications services at reduced prices, whilst licensees have invested in the latest technologies, such as 4G mobile and fibre broadband services.
- 6 Previous National Telecommunication Plans have laid the foundations for these developments. The third NTP included policies to promote growing competition in the Kingdom's mobile sector. In turn, the fourth NTP included the policies to support the roll out of the national fibre-based national broadband network and promote retail competition in the fixed telecommunications sector. As such, the sector has seen various achievements since the propagation of the Fourth NTP, and among such achievements:
  - a. Batelco has separated, from the rest of the company, its wholesale fixed network business and created Bahrain Network BSC(c) (BNet). In turn, BNet began offering wholesale fibre network services throughout the Kingdom as its national broadband network now passes more than 78% of households.
  - b. consumer take-up of fibre broadband services has also increased, with around 104,000 customers using such services as at the end of 2019.
  - c. spectrum in the 800MHz and 2600MHz bands has been assigned to the mobile operators, to help meet growing demand for data connectivity, as well as assigning spectrum in the 3GHz band to all mobile operators to enable rollout of 5G networks.
  - d. the mobile sector has continued to support positive outcomes for consumers with 4G networks being available to almost all of Kingdom's consumers and operators having started to roll out 5G networks successfully; and
  - e. the Kingdom has successfully attracted global investors in the ICT space, with Amazon Web Services choosing the Kingdom as its regional hub.
  - f. Issuance of Domain Name Decision governing the registration and use of country code Top Level Domains (ccTLD) in both the English (.bh) and Arabic (.البحرين) languages.
- 7 Given changes in consumer preferences and level of demand and rapid speed of evolution of technologies, the sector is constantly developing, with the links between telecommunications, ICT and the wider economy ever-expanding. This new Plan is, therefore, required to reflect these new trends in the sector and to ensure that the Kingdom is well placed to seize opportunities arising from these ever increasing links, support the growth of its digital economy and to respond to the challenges that such links may also create.
- 8 Furthermore, the unprecedented impact of the COVID-19 crisis has underscored the importance of having a robust and widely accessible digital infrastructure, as well as the tools and knowledge to harness the power of telecommunications and ICT to effectively meet the challenges, and maximise opportunities, as the Kingdom responds to the pandemic.

### 3 The Government's Vision for the Sector

- 9 The telecommunications and ICT sector underpins the success and prosperity of the Kingdom's economy, as it is one of the key factor in diversifying the Kingdom's economy, expanding its digital economy and supporting all aspects of the economy from the financial services sector to the technology sectors, in the following manner:
- a. The telecommunications sector is an important input across all sectors. However, the digital revolution now means the use of digital data and digital services infuse the production and supply processes across the entire economy. World class telecommunications infrastructure to support the telecommunication and ICT sector is, therefore, essential for promoting Kingdom's economic growth and diversification.
  - b. The telecommunications and ICT sector will have a crucial role in providing the underlying infrastructure and essential services to support Industry 4.0 and new applications. As goods and services that people use on a daily basis are increasingly connected to the internet, which in turn means increased reliance on the telecommunications networks that carry the mass of data generated and the telecommunications and information technologies that process and analyse this data. The availability of such networks to support such data transfers and analysis is thus essential to enable innovation in Bahraini firms and driving productivity improvements across the economy, while it is also important to enhance data protection mechanisms and consumer confidence in the ways their data is stored and used, given that data is the main driver of Industry 4.0.
  - c. The telecommunications and ICT sector remains an important social enabler, as it provides means of communication with each other and means of access to different social and public services such as health or education. Further, it provides access to the entertainment content. It is essential, therefore, for social cohesion, that all Bahraini consumers are able to access high quality telecommunication and ICT services.
- 10 Given the importance of the telecommunications sector to the Kingdom, and the increasing links with ICT, **the Government's vision for the sector**, as set out in this Plan, is as follows:
- a. To ensure that world leading, resilient, and future-proofed telecommunications infrastructure and services are available and accessible to, and used by, all Bahraini businesses and consumers, with the infrastructure and services being able to meet the growing demand for data connectivity, at reasonable prices and a high quality of service.
  - b. To ensure that the consumer is placed at the forefront of all policy measures, with the consumer is able to rely on sustainable and competitive markets delivering high quality data connectivity at reasonable prices, while being protected from cyber threats.
  - c. To support the Kingdom's digital economy, the development of digital transformation across all sectors and the growth of new sectors such as AI, so that the telecommunications and ICT sector are able to support growth across all sectors of Kingdom's economy and make an increasing contribution to economic growth.
  - d. To support the Kingdom's role as a regional hub for telecommunications and ICT, by ensuring the Kingdom has the network infrastructure and policies necessary for it to enhance its role.

#### **4 Overview of the Government's Strategic Plan and Policy for the Sector**

- 11 Building on the successes of the sector since liberalisation, the Government believes that enabling and giving effect of sustainable competition, wherever possible and efficient, is the most appropriate basis through which its vision, as set out above, can be met, in particular competition in retail markets and given that it is also a driver of innovation and investment.
- 12 The Government also recognises that further policy measures will need to be taken if it is to meet its vision. These policy measures are set out in the remainder of this Plan and have, at their heart, the following objectives:
  - a. To confirm the role of BNet as owner and operator of the fibre-based national broadband network in the Kingdom, providing equivalent access to world leading services to all other licensees on equivalent terms and conditions; so enabling those licensees to meet the demands of consumers and businesses by providing world leading retail telecommunications services at fair and reasonable prices, and enabling other licensees to compete on an equal footing in retail markets.
  - b. To ensure that the majority of the Kingdom's population benefit from being able to access mobile 5G networks, with sufficient spectrum having been assigned to the licensed mobile service providers and measures taken to ensure that such advanced mobile networks can be deployed efficiently and effectively in the Kingdom, with network infrastructure being shared where it is economically efficient to do so and with developing a regulatory framework that supports innovation and investment.
  - c. To ensure that the Kingdom is able to meet the demands for ever increasing volumes of international connectivity on diverse options and routes at fair and reasonable conditions.
  - d. To ensure that consumers truly benefit from the infrastructure deployed and are able to take informed decisions in relation to offered services, while making sure that consumer groups with special requirements are supported.
  - e. To ensure that the Kingdom's telecommunications infrastructure and services are robust to the threats that can arise in today's world.
  - f. To ensure that the legal and regulatory framework supports the objectives set out above and is fit for purpose in today's telecommunications sector.
  - g. In light of the increasing links between telecommunications and ICT and the digital economy, the Government also sets out in this Plan measures which seek to develop the Kingdom's digital economy and ICT ecosystem, through measures which promote innovation and investment in the sector protection of data, support the growth of human capital, and ensure the Kingdom is able to take advantage of the new opportunities that will arise from the development of sector.

## **5 Key Policies for the Telecommunications Sector Going Forward**

### **I. National Fibre Infrastructure in the Kingdom**

- 13 By June 2020, the roll out of the fibre-based national broadband network has progressed rapidly, as the fibre broadband infrastructure passes more than 78% of households.
- 14 This growth in fibre roll out has been achieved through the creation of BNet as the provider of the national broadband network in the Kingdom. BNet supplies its services to licensees who can compete in providing retail fixed connectivity services to residents or businesses, or mobile operators who use fibre as an input in providing mobile services.
- 15 As the provider of the national broadband network, BNet infrastructure and services are the foundations supporting businesses across many sectors, whereby high capacity connectivity has become an essential input across many sectors of the economy, whether for datacentres, large content firms who require very high capacity connectivity, or financial services institutions that require resilient, secure, and low latency networks.
- 16 BNet's national broadband network is also an essential input for mobile operators, with fibre backhaul and fronthaul being an increasingly important input to mobile data services, including 5G services. The Government also recognises that many public radio communication stations do not currently have fibre connectivity, with mobile operators still relying on microwave connections in many cases to connect different parts of their networks.
- 17 Despite the critical role of the national broadband network, the Government notes that there remain challenges to the efficient roll out of the national broadband network. In particular, rolling out the national broadband network to new real estate developments on the same basis as other public utilities can be challenging. This can add to the time and costs subsequently required to deploy the necessary telecommunications infrastructure in those developments.
- 18 In addition, Other Licensed Operators (OLOs) continue to own and operate fibre that they controlled prior to the creation of BNet. This can create asymmetries in the network services and costs between licensees with access to dark fibre and those that solely rely on BNet's active services. This current position may also potentially limit the demand for some BNet services.
- 19 Finally, for OLOs and consumers, to benefit from the national broadband network, it is important that BNet uses its infrastructure to provide world leading services, at fair and reasonable prices, that meet the demands of licensees, and which are provided on an equivalent and seamless basis, as stated in NTP4 in relation to the separation project. This separation has progressed significantly, with BNet having been established as a separate legal entity from Batelco in 2019, and the Authority publishing a detailed Reference Offer Order setting out the terms and conditions upon which BNet must provide services to OLOs. This Reference Offer Order also recognised that achieving full equivalence would require further work in the upcoming phase. The process for completing the full internal systems and organisational separation is under way and the Equivalence Compliance and Technical Committee (ECTC) that will monitor equivalence requirements has been established and began operations in mid-2020.
- 20 **Therefore, Government Policy in this area is as follows:**

- 21 The Government believes that this fifth NTP should build on the positive progress made on developing the national broadband network since the publication of NTP4. That is, this Plan should set out the basis for the completion of the national broadband network such that its coverage is close to ubiquitous for all households and businesses in the Kingdom and that all aspects of the separation are completed, such that Equivalence of Inputs (EoI) is implemented fully and within the required timeframes as follows:
- a. The Government confirms that BNet shall be the Kingdom's national provider of fibre based fixed connectivity, using "future proof" and secure network architecture and technologies to offer wholesale network services over the national broadband network to other licensees.
  - b. The Authority shall not issue a new Fixed Telecommunications Infrastructure Network Licence to any new applicants during the period of NTP5. However, should BNet fail consistently to meet its obligations, including the roll out targets set herein for the national broadband network, then the Government may direct the Authority to review the market to assess whether the existing market structure remains appropriate.
  - c. BNet's national broadband network shall always pass at least 95% of households in the Kingdom. For the purpose of calculating this percentage and measuring BNet's performance on this target, any household which could be connected with a time period not exceeding two weeks of a connection request will be considered a home passed, provided that the latest household statistics at the time of calculation are used. Additionally, BNET shall ensure that its network is capable of offering, at a minimum, 100Mbps download speeds. To enable downstream operators to plan their service portfolios, BNet should publish accurate digital coverage maps showing the availability of the relevant network technology at each address.
  - d. BNet shall also be capable of providing fibre connections, upon request, to 100% of business premises offering, at a minimum, symmetric download and upload speeds of 1Gbps. For the purposes of this target, the definition of businesses premises excludes premises of businesses run from residential premises or small offices, as to be determined by the Authority.
  - e. BNet shall be capable of offering fibre connections to 100% of public radiocommunication stations, all submarine cable landing stations, datacentres and all other network nodes, with sufficient capacity to support the needs of end-users, including reasonable demands of specific end-users for network resilience and redundancy.
  - f. The Government will ensure that telecommunications infrastructure can be deployed in the most efficient manner, by coordinating with public authorities responsible for planning and authorising property developments to require property and land developers to integrate the infrastructure required to support telecommunications networks when designing new developments and related works and accommodate the requirements of national broadband network when works are conducted.
  - g. The Authority will continue to monitor the obligations on BNet in relation to coverage, as well as determine and monitor obligations relating to the supply of services on an Equivalence of Inputs basis and quality of service particularly in homepassed areas reported by BNet and take necessary remedial measures should BNet not meet its obligations. In this regard, the Authority shall continue to review reports and issues raised by the ECTC and continue to monitor and report on these obligations.

- h. The Authority shall ensure that BNet and the OLOs undertake all necessary measures to ensure that seamless consumer experience throughout the process of service ordering and provisioning of services using the national broadband network by determining the required KPIs and obligations in this regard particularly in homepassed areas reported by BNet; such that service ordering and provisioning or fault management or other activities undertaken by BNet to support the consumer, can be managed by the OLO providing the retail service smoothly and without delay, such that retail consumers experience a seamless service. The Authority may take necessary measures in the event BNet fails to comply with the maximum period within which subscribers should be connected especially in homepassed area reported by BNet, which has been determined as two weeks from the date of connection request.
- i. The Authority shall continue to review the services offered by BNet in its Reference Offer, to ensure it meets the current and anticipated near-term future needs of licensees. As part of this, the Authority shall consider whether a requirement for BNet to introduce a dark fibre wholesale product would be beneficial in supporting the Government's Vision for the sector.
- j. By August 2021, the Authority shall confirm whether BNet services are provided on an equivalent basis and meet the reasonable needs of all licensees. If the Authority so confirms this, it shall work, in consultation with other relevant stakeholders, to determine the most appropriate treatment of OLO fibre assets to meet the single network objective, including due consideration of decommissioning of OLO fibre assets as a possible course of action. If services are not provided on an equivalent basis at this time, the Authority shall take necessary remedial measures which could include mandating BNet to introduce a dark fibre service as part of its Reference Offer.
- k. The Authority shall, in consultation with BNet and all other relevant stakeholders, determine reasonable and practicable measures to enhance the independence of BNet's governance and ensure the implementation of such measures by the end of the NTP5 period. BNet shall allow for additional investment into its business from other parties, including OLO in the Kingdom, subject to that investment being consistent with relevant licence terms and applicable laws and regulations. The process and timetable for implementation shall be consulted upon with all relevant stakeholders.
- l. In light of the changes in the telecommunications market structure due to the separation project and the establishment of BNet, the Authority shall ensure its regulatory framework is suitable for the new market structure

## **II. Mobile Competition, Spectrum and 5G**

- 22 The Government believes that the mobile sector, as currently structured with three mobile network operators (MNOs), supports both good consumer outcomes and the wider objectives for the telecommunications and ICT sector as set out in this Plan. In particular, retaining a competitive mobile sector supports the Kingdom as a hub for ICT and should promote efficient investment in 5G services.
- 23 Furthermore, the sector stands at the beginning of the next wave of mobile technology as 5G networks begin to be rolled out. However, while MNOs are expanding their 5G network deployments, the current deployment of 5G networks in the Kingdom is focused on the areas with highest demand.



- 24 Mobile network operators are expected, initially, to focus their 5G networks and services on offering consumers enhanced mobile broadband services. In the coming years, these networks will then have to be expanded further to support a series of new use cases, including significant deployments of M2M (Machine to Machine), Internet of Things (IoT) and specialised low latency services using 5G networks.
- 25 Ensuring that MNOs have the ability to efficiently deploy 5G networks and that suitable 5G services are made available, on a timely basis, to consumers and businesses is a key objective of this NTP5. Given the need to meet demand for new wireless services, the Government believes that measures to reduce the costs and barriers to investment will benefit the sector and enable the Kingdom to meet growth in demand for data connectivity and support for new services.
- 26 Over recent years, the Government and the Authority have supported mast sharing; both to lower the costs of network roll out and to ensure that the adverse environmental impact of a proliferation of masts is kept to a minimum. As a result, the use of mast sharing has increased since the issuance of NTP4. Currently around 19% of masts are shared (up from 12% in 2015 at the time of the NTP4). Mast sharing can bring positive outcomes for all parties: consumers who can benefit from greater coverage and network capabilities and the operators who are able to avoid unnecessary costs. Mast sharing also reduces the visual and environmental impact of the mobile network infrastructure. The process for obtaining approvals for site sharing is set out in the Authority's Regulation on permitting, installing, upgrading and maintaining Public Radiocommunications Stations (the "PRS Regulation"). This sets out clear KPIs on the timeframe over which operators should receive approvals, subject to the appropriate documentation being received. Despite this, the Government is aware of some challenges faced by MNOs in relation to these approvals, resulting in longer approval timeframes. The Government also notes that the site rectification process put in place through that Regulation has increased the costs faced by the MNOs.
- 27 Therefore, Government Policy in this area is as follows:**
- a. During the period of this NTP5, the majority of consumers in the Kingdom should have access to 5G networks and services.
  - b. In return for a commitment from the mobile network operators to agree roll out obligations at least consistent with the above policy objective, the Government, in consultation with the Authority, shall identify and take forward relevant measures to support and incentivise the required investment, with such measures potentially including incentives relating to Spectrum Usage Right Fees for those spectrum bands assigned for the purposes of MNOs deploying 5G networks.
  - c. The Government, in coordination with the Authority and other relevant stakeholders, shall prepare a strategy roadmap to ensure that the Kingdom is ready for the "second and third phases" of 5G services, i.e. M2M / IoT services and specialised low latency services using 5G networks. This roadmap will consider whether support for supply of M2M / IoT services or low can be enabled by issuing of MVNOs licences which are specific for M2M / IoT services or specialised low latency services using 5G networks.
  - d. The Authority will produce forecasts of the demand for spectrum for Mobile Telecommunications services for the following five-year period. The Authority will in coordination with the Radiocommunication Authority, and supported by these forecasts, continue to identify and release spectrum to meet this growing demand. In particular, the Authority, in consultation with the Government, shall identify spectrum

which can be used to promote innovation in emerging 5G and IoT use cases and shall determine the most appropriate way of making this spectrum available to ensure that innovation can rapidly take place.

- e. The Authority shall not issue new individual mobile telecommunications licences during the period of NTP5. However, should there be significant change in the mobile market or extenuating circumstances, then the Government may direct the Authority to review the market to assess whether the existing market structure remains appropriate. Notwithstanding this commitment, the Authority may issue a MVNO licence for the purpose of providing M2M / IoT services or specialised low latency services using 5G networks, if this is deemed in the Kingdom's interest to do so.
- f. The Authority in coordination with other relevant stakeholders and working with other relevant public bodies, shall regularly review and enhance the processes for approving the installation, upgrade and maintenance of sites, to ensure the most efficient deployment of infrastructure, consistent with the objectives of the Government.
- g. For existing sites, the Authority shall review its mast rectification requirements with a view to ensuring that these are proportionate and minimise the impact on MNOs' ability to sustainably invest in enhancing their mobile networks and the services offered to consumers.
- h. The Authority shall continue to support site sharing and it shall require that all new mobile sites deployed by MNOs should be capable of being shared, where technically feasible and provided it does not lead to a substantial lessening of competition.
- i. The Government will ensure that telecommunications infrastructure can be deployed in the most efficient manner, by requiring that all new developments should be equipped with in-building mini duct, in-building access points, or other physical infrastructure to support mobile network coverage in those developments.

### **III. Supply of international connectivity to and from the Kingdom**

- 28 In an increasingly interconnected world, access to international connectivity is vital. Access to international connectivity is, therefore, an essential element in meeting the Government's goal that the Kingdom becomes a regional hub for telecommunications and ICT.
- 29 The Kingdom's international connectivity is currently supplied by a number of international cables. While in the near term the Government considers that available bandwidth is sufficient to meet the Kingdom's requirements, growing demand for connectivity will mean that the Kingdom will need continued investment in international connectivity. Furthermore, certain corporate users will place ever greater value on the resilience and redundancy offered by having access to connectivity on multiple routes.
- 30 That is, the Government needs to ensure that it offers sufficient capacity to meet growing demand, and to ensure that network resilience and redundancy is provided via a network of distinct connectivity cables.
- 31 In addition, Government policy in this regard needs to ensure that infrastructure is in place, and that it is used and accessible under fair and reasonable conditions. In this regard, and following the policy actions set out in NTP4, the Authority has taken steps to mitigate the impact of bottlenecks in the access to international connectivity with it completing a review

of the relevant market, following which appropriate remedies will be placed on any licensees holding Significant Market Power or Dominance in a relevant market.

**32 Therefore, Government Policy in this area is as follows:**

- a. The Authority, alongside other relevant stakeholders, will identify and take forward regulatory or other measures to encourage and enable stakeholders to invest in diverse international cable routes landing in the Kingdom, including, if relevant and necessary, taking forward changes to the licensing framework for international connectivity facilities and services.
- b. The Government, in coordination with relevant stakeholders, will identify suitable sub-sea corridors for cable routes and appropriate land to locate landing stations to assist in timely investment.

**IV. The Consumer Experience**

33 The Government considers that the consumer must be at the heart of policy for the sector.

34 Previous NTPs have laid the foundation for the Kingdom's consumers to benefit from world-leading communications services, where national broadband network offers high coverage of full fibre connectivity and strong competition in mobile services has led to positive outcomes for consumers.

35 While the majority of consumers experience fast mobile data connections, average mobile download speeds and congestion ratios will need to continue to improve if the Kingdom is to maintain its position as a world leader in the provision of high-quality mobile data services to consumers.

36 Furthermore, it is necessary to ensure that consumers are protected even in well-functioning and competitive markets, particularly those consumers who form part of societal groups with special requirements, and to ensure that all consumers are able to access sufficient and relevant information to inform their decision making.

37 For competition to be effective, consumers need to be able to compare clearly the quality of service offered by their operator with that offered by rivals, where this will support consumers to make active and informed decisions, in turn resulting in licensed operators competing to offer the best service. Currently, the TRA collects and disseminates network QoS information and publishes regular network QoS and coverage reports, so enabling consumers to examine the network performance of operators in the Kingdom. Furthermore, the Authority has developed a consumer protection framework, however, additional information for consumers could further support competition in the sector.

**38 Therefore, Government Policy in this area is as follows:**

- a. The Government requires that consumers should benefit from improving average download speeds over time, to meet evolving consumer requirements, and aspires to be among the leading countries regionally, when it comes to download and upload speeds. The Authority will monitor and publish the data on average download speeds for fixed and mobile networks.
- b. The Authority shall ensure that relevant data, as determined by the Authority, shall be provided to consumers in the Kingdom (such as on price-terms, contractual periods, notice of end contractual period and QoS), in any easily understood and accessible

format, so that consumers can use it to take informed decisions about their telecommunications services.

- c. The Authority will continue to promote awareness relating to the safe use of on-line services and the protection of consumers in the Kingdom through its initiatives and information awareness campaigns such as Safesurf.
- d. The Authority shall study the needs of groups with special requirements and consider whether it is necessary to implement measures to support such groups' access to, and use of, telecommunications services, including by way of Universal Services.

## **V. National Security of Electronic Communications Networks and Services**

- 39 The Kingdom's economy and its prosperity depends on secure telecommunications and ICT infrastructure. Therefore, ensuring that the Kingdom's telecommunications and ICT infrastructure is secure to cyber and physical threats is an ongoing objective for the Government.
- 40 This is a government wide (rather than sector) issue which requires coordination between all relevant government and private sector bodies.
- 41 Specifically within the telecommunications sector, the Authority has undertaken a number of actions since the last NTP to secure the Kingdom's cyber security, including the implementation of the Critical Telecommunications Infrastructure Risk Management Regulation. The Government, through the relevant cybersecurity entity, will continue to prioritise measures to promote the resilience of Kingdom's Critical National Infrastructure.
- 42 Furthermore, ensuring the ongoing security of the sector's Critical National Infrastructure relates not just to hardware and software, but to how all end users adopt cyber awareness behaviours. The Government, through the relevant cybersecurity entity, will continue to promote cooperation amongst all Government and industry stakeholders and users to ensure a coordinated approach to cybersecurity across all sectors that rely on critical telecommunications infrastructure and services.
- 43 **Therefore, Government Policy in this area is as follows:**
  - a. The Authority, in coordination with the relevant cybersecurity entity, shall ensure resiliency of national telecommunications infrastructure.
  - b. The Authority shall implement, in coordination with the relevant cybersecurity entity and relevant stakeholders, a telecommunications sector-specific emergency and disaster recovery plan to complement the Critical Telecommunications Infrastructure Risk Management Regulation.
  - c. The Authority, in coordination with the relevant cybersecurity entity, shall ensure that the sector carries out regular drills to test the preparedness of the sector to respond to cyber and physical threats, including considering risks which are amplified by emerging or innovative technologies used within the sector.
  - d. The Authority shall set out the requirements on the sector to identify, detect, protect and respond to cyber security threats alongside recovering from related incidents.
  - e. The Authority shall ensure that appropriate regulatory measures, information and awareness measures and training are undertaken to mitigate cyber security risks. As part of this, the Authority must examine how information related to cyber threats can be shared within the sector.

## **VI. The Legal and Regulatory Framework**

- 44 The licensing regime is at the heart of the legal and regulatory framework of the sector. It was designed to meet the needs of fixed and wireless narrowband and broadband telecommunications services. However, over the coming years, there are likely to be new types of services and network suppliers emerging, such as for IoT and 5G services.
- 45 Similarly, network infrastructure requirements for 5G might be very different to those for existing networks: requiring significant investment in very dense network infrastructure in some areas and increasing use of indoor networks. It is important, therefore, that the legal and regulatory framework governing the sector gives licensees sufficient certainty to support these continuing investments.
- 46 The Government recognises that in this rapidly evolving climate it is necessary to periodically review the regulatory and licensing framework governing the sector to ensure that it keeps pace with the changes in the sector. To that end, the Authority has commenced reviews of the Telecommunications Law and Licence Regime.
- 47 **Therefore, Government Policy in this area is as follows:**
- a. The Authority should complete its review of the service licensing framework and template licences, and suggest to Government, for consideration and approval any required amendments necessary to ensure that this framework and any template licences are fit for purpose in light of sector developments.
  - b. The Authority should conduct a study on the appropriate length of frequency licences for Mobile Telecommunications services. This should take into account the general trend for licences to be issued for longer periods than is currently the case in the Kingdom, the interaction between frequency and service licences and the impact of any amendment on the treatment of Frequency Licence Fees.
  - c. The Authority should support and encourage the sector to increase use of IPv6 and ensure there remains sufficient IPv4 addresses to meet the sector's needs during the transition to IPv6.

## **VII. Developing the Digital Economy and the Telecommunications and ICT Ecosystem**

- 48 The Government wishes to ensure that the Kingdom is at the centre of new innovations in ICT services, with these driving forward the Kingdom's digital economy. This is because the ability to generate, use and ultimately export innovation will be central to the Kingdom's ambitions to grow and diversify its economy towards high value-added sectors such as content development and distribution, Artificial Intelligence (AI) and broader ICT.
- 49 Moreover, the COVID-19 pandemic has emphasised the need for organisations to be able to seamlessly offer services through digital platforms to support the resilience and stability of the whole economy. In addition, COVID-19 has shown how the Kingdom's economy can quickly change and adapt to meet such challenges. This time of change is therefore an opportunity for the Kingdom to reflect on how ICT can support the wider objectives and the 2030 Vision or achieving Sustainable Development Goals.
- 50 To maximise the opportunities offered by the growing digital economy, the Government wishes to ensure that the Kingdom has the right business and regulatory environment to encourage investment in ICT related innovation and research and development (R&D);

that the sector has access to the best talent and skills; and that the government plays an active role in supporting the sector and growing the digital economy.

- 51 The Government believes many factors fundamental to achieving these objectives are already in place, where the Kingdom has been successful in attracting investment in the ICT sector with the Kingdom having seen entry from large content and ICT service providers.
- 52 The Kingdom has also taken steps to implement laws and regulations on the use of data such as the Personal Data Protection Law, which provides transparency and certainty for stakeholders. In order to ensure that the Kingdom remains attractive to ICT stakeholders wishing to invest in the sector, it needs to continue to ensure that its regulatory framework continues to reflect the evolving landscape.
- 53 The Kingdom has also progressed in the development of its ICT skills base. Universities have developed their curriculum in some areas to offer the most relevant skills to train and equip the next generation of ICT workers. Furthermore, vocational and on the job training is supported by Tamkeen which provides a range of training programs, grants for training and advisory services for Bahraini businesses and employees.
- 54 However, in the growing and rapidly evolving ICT sector, the availability of qualifications, courses, training, and learning opportunities need to continually grow and adapt to the requirements of the sector. The Government is aware that the supply of ICT skills of the future will depend not just on ensuring that there are appropriate tertiary degree courses but that there is a concerted and coordinated approach to delivering skills from school through to vocational training. The Government also recognises that promoting ICT related R&D will be increasingly important to support the long-term growth of the digital economy.
- 55 **Therefore, in addition to the policies set out elsewhere in this Plan, the Government has identified that the following actions are necessary to support the development of the digital economy and ICT ecosystem.** Although some of these may fall outside the remit of the NTP, they are listed here in order to clarify the important links between telecommunications and the ICT ecosystem.
  - a. The Government shall identify the necessary measures to hasten the Kingdom's digital transformation, reflecting on the use of telecommunications and ICT to meet the challenges of the COVID-19 pandemic. The Government will consider the lessons learned from this pandemic to ensure that the telecommunications and ICT sector is fully prepared to meet any similar future challenges. It will identify how opportunities created as a result of the use of telecommunications and ICT in response to the COVID-19 can accelerate and support the Kingdom's objectives.
  - b. The Government should develop a national digital transformation strategy, including its role as a strategic user of innovative telecommunications and ICT services, such as IoT technologies. The Government should draft a national strategy on Artificial Intelligence (AI), with this covering measures to foster investment and innovation in AI technologies, measures to ensure the Kingdom has the appropriate skills in place to maximise the opportunities from AI and measures to ensure that the Kingdom has in place appropriate policies on data sharing and AI ethics.
  - c. The Government should identify the capacity building needs to provide skills relevant to the digital economy and undertake relevant actions to ensure that the Kingdom has the necessary skills to support the sustained growth of its telecommunications and ICT ecosystem and digital economy.

- d. The Government should promote and support facilities for research and pre-commercial testing of technology, including 5G or Narrow Band (“NB”) IoT technologies. The Government should identify the relevant initiatives to encourage innovation in telecommunications and ICT and the digital economy, including the possibility of establishing a fund for this purpose, as well as support public and private institutions undertaking R&D to encourage and facilitate R&D focused on telecommunications and ICT and the digital economy, with a view to ensuring funding for research is appropriately prioritised on these areas.
- e. The Government shall support and encourage appropriate initiatives led by the ICT sector stakeholders to establish a carrier neutral Internet Exchange (IX).
- f. The Government shall ensure that the relevant legal instrument required to execute the Personal Data Protection Law are in place in order to enhance data protection mechanisms, given that data is the main driver of Industry 4.0.
- g. In light of the recent and expected changes in the sector, the Government will review and suggest changes in the Telecommunications Law to ensure there are no gaps in the framework governing the telecommunications and ICT sector.

## **6 Implementation**

- 56 Government has identified a number of steps that will be implemented over the next three years in order to achieve the policy objectives set out in this Plan. Government intends to work closely with the Authority and all industry participants and other relevant stakeholders and organisations during the implementation phase. This collaboration will benefit all licensees as well as Bahraini consumers and enterprises, while at the same time ensuring that the Kingdom retains its position at the forefront of digital developments in the region and globally.