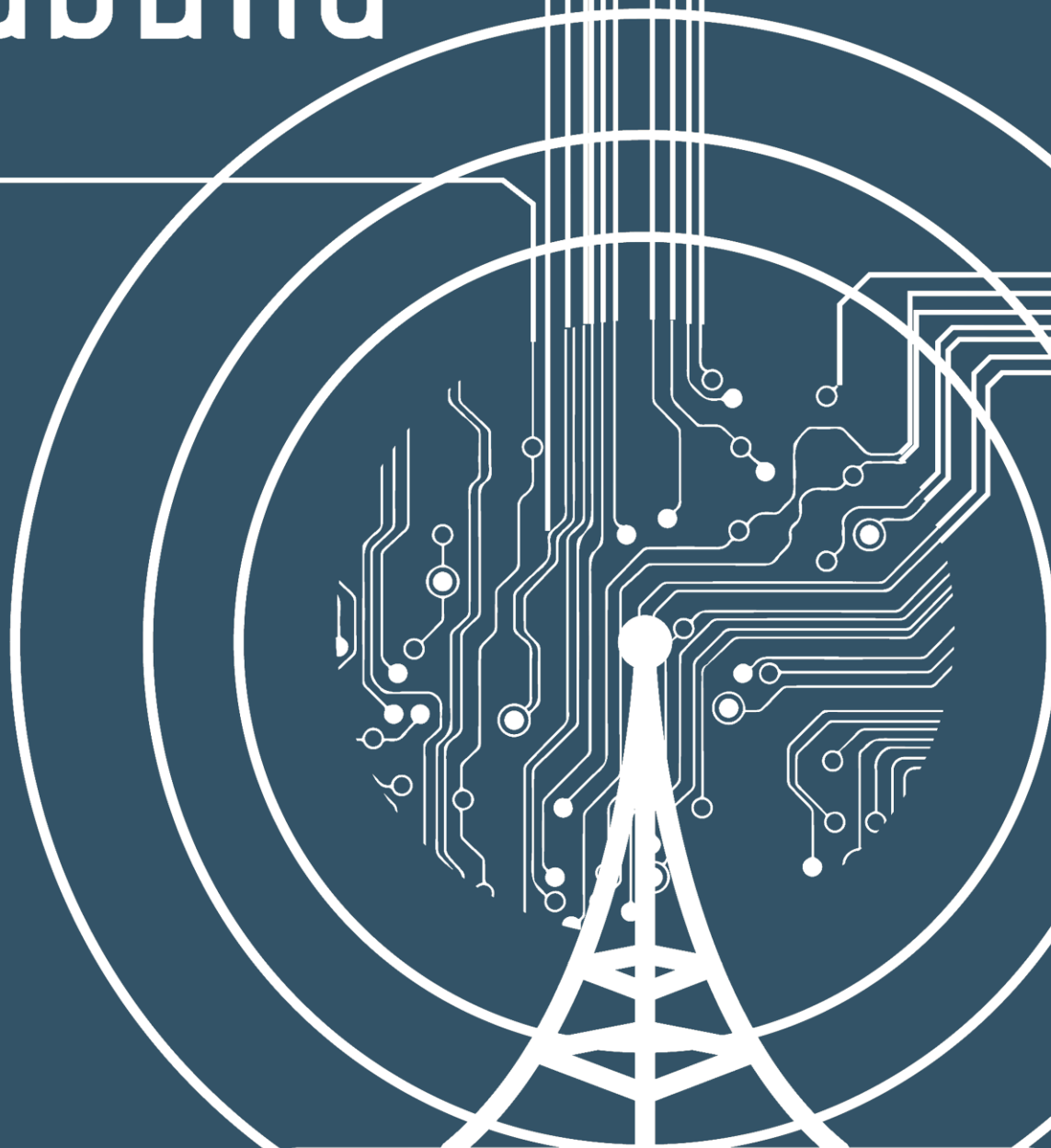


# National Broadband Plan



**Building Infostructures  
for a Digital Nation**





REPUBLIC OF THE PHILIPPINES  
DEPARTMENT OF INFORMATION AND  
COMMUNICATIONS TECHNOLOGY

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# NATIONAL BROADBAND PLAN

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# PREFACE

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Advances in information and communications technologies (ICTs), particularly in broadband technologies, have unlocked numerous socio-economic opportunities for the Philippines. Considered as the *fourth utility*, broadband has provided substantial efficiencies and innovative solutions cutting across several sectors, thereby magnifying the potential in contributing towards inclusive and sustainable growth of the country.

Given the socio-economic benefits that broadband brings, I believe that it is imperative that investments in open, pervasive, inclusive, affordable, and trusted information infrastructures or *infostructures* should be prioritized.

In view of this, the Philippine government, in its desire to accelerate the deployment of fiber optic cables and wireless technologies all over the country, particularly in far-flung or remote areas, to improve the overall internet speed of the country, developed the National Broadband Plan (NBP).

NBP will provide necessary policy, regulatory and infostructure interventions to ensure the delivery of universal, fast, reliable, affordable broadband internet services to Filipinos in a digital economy.

Further, this plan will also ensure the realization of the Philippines' long-term vision called *AmBisyon Natin 2040* and the country's commitments to the ASEAN ICT Masterplan (AIM) 2020 of improving the quality of life in the country and in the ASEAN region. Indeed, our contract with the Filipino people is foremost in the achievement of the nation's goal of prosperity for all.

The Department of Information and Communications Technology (DICT), as the country's primary agency mandated to ensure the universal access to quality, affordable, reliable, and secure ICT services, through the NBP will lay the groundwork for the National Governmental Portal (NGP) and the Free WiFi in Public Places, among others – by providing the necessary infostructures needed.

To ensure timely and effective implementation and monitoring of strategies identified in the NBP, close collaboration with relevant stakeholders (government, industry, academe, civil society, technical organizations, etc.) a necessity.

It is with this sense of urgency that the administration advocates for the development of the broadband ecosystem for use of the internet in participatory democracy.

With the NBP, the government through the leadership of the DICT shall be the prime mover in *building infostructures for a digital nation*.



**RODOLFO A. SALALIMA**  
**Secretary, Department of Information and  
Communications Technology**



# NATIONAL BROADBAND PLAN

## BUILDING INFOSTRUCTURES FOR A DIGITAL NATION

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**GLOSSARY**



# ABBREVIATIONS AND ACRONYMS

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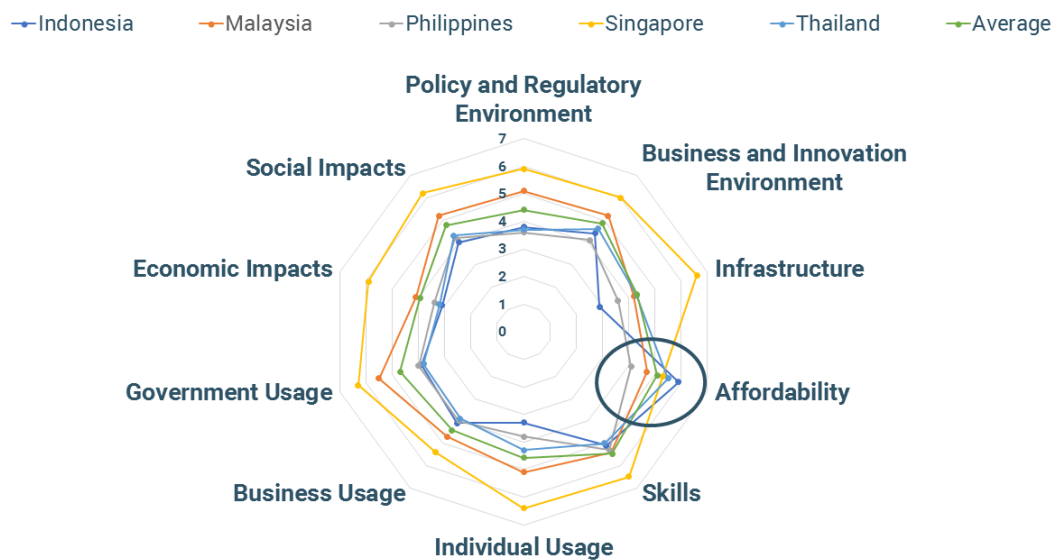
<b>2G</b>	Second Generation of Mobile Network Technology
<b>3G</b>	Third Generation of Mobile Network Technology
<b>4G</b>	Fourth Generation of Mobile Network Technology
<b>AAG</b>	Asia-America Gateway Cable System
<b>APCN-2</b>	Asia-Pacific Network-2
<b>API</b>	Application Program Interface
<b>ASE</b>	Asia Submarine Cable Express
<b>BCDA</b>	Bases Conversion and Development Authority
<b>BIMP-EAGA</b>	Brunei-Indonesia-Malaysia-Philippines East Asia Growth Area
<b>BEST Cable</b>	BIMP-EAGA Submarine Terrestrial Cable System
<b>CATV</b>	Cable Television
<b>CII</b>	Critical Information Infrastructure
<b>CMTS</b>	Cellular Mobile Telephone System
<b>CoP</b>	Communities of Practice
<b>DBM</b>	Department of Budget and Management
<b>DepEd</b>	Department of Education
<b>DICT</b>	Department of Information and Communications Technology
<b>DTI</b>	Department of Trade and Industry
<b>DFON</b>	Domestic Fiber Optic Network
<b>DSWD</b>	Department of Social Welfare and Development
<b>EAC-C2C</b>	East Asia Crossing – City-to-City Cable System
<b>eGDI</b>	e-Government Development Index
<b>EPI</b>	e-Participation Index
<b>FOBN</b>	Fiber Optic Backbone Network
<b>FOI</b>	Freedom of Information
<b>FTTx</b>	Fiber-to-the-X
<b>GDP</b>	Gross Domestic Product
<b>GITR</b>	Global Information Technology Report
<b>GNI</b>	Gross National Income
<b>HDI</b>	Human Development Index
<b>ICT</b>	Information and Communication Technology
<b>IDI</b>	ICT Development Index
<b>iGovPhil</b>	Integrated Government Philippine Program
<b>IPP</b>	Investment Promotions Plan
<b>IT</b>	Information Technology
<b>ITU</b>	International Telecommunication Union
<b>ITU-T</b>	International Telecommunication Union – Telecommunication Sector
<b>MGI</b>	McKinsey Global Institute
<b>MITF</b>	Modular Information Technology Facility

<b>MSMEs</b>	Micro, small and medium enterprises
<b>NEDA</b>	National Economic and Development Authority
<b>NBP</b>	National Broadband Plan
<b>NGAs</b>	National Government Agencies
<b>NGCP</b>	National Grid Corporation of the Philippines
<b>NRFAT</b>	National Radio Frequency Allocation Table
<b>NRI</b>	Networked Readiness Index
<b>NTC</b>	National Telecommunications Commission
<b>PCC</b>	Philippine Competition Commission
<b>PDS</b>	Philippine Digital Strategy
<b>PDP</b>	Philippine Development Plan
<b>PhOpenIX</b>	Philippine Open Internet Exchange
<b>PHIMF</b>	Philippine Internet Measurement Facility
<b>PSA</b>	Philippine Statistics Authority
<b>PhII</b>	Philippine Integrated Infostructure
<b>PLC</b>	Power Line Carrier
<b>PPP</b>	Public-Private Partnership
<b>QoSE</b>	Quality of Service Experience
<b>RA</b>	Republic Act
<b>RAO</b>	Reference Access Offer
<b>SEA-ME-WE-3</b>	South East Asia – Middle East – Western Europe – 3
<b>SEA-US</b>	Southeast Asia – United States Submarine Cable
<b>SEC</b>	Securities and Exchange Commission
<b>SDH</b>	Synchronous Digital Hierarchy
<b>STM</b>	Synchronous Transport Module
<b>SJC</b>	Southeast Asia Japan Cable
<b>SONA</b>	State of the Nation Address
<b>SUCs</b>	State Universities and Colleges
<b>Tech4ED</b>	Technology for Education, Employment, Entrepreneurs and Economic Development
<b>TELECPHIL</b>	Telecommunications Infrastructure Corporation of the Philippines
<b>TELOF</b>	Telecommunications Office
<b>TGN-IA</b>	Tata TGN - Intra Asia
<b>TVWS</b>	TV White Space
<b>UASF</b>	Universal Access and Service Fund
<b>UNESCAP</b>	United Nations Economic and Social Commission for Asia and the Pacific
<b>WEF</b>	World Economic Forum
<b>WiFi</b>	Wireless Fidelity
<b>WWW</b>	World Wide Web

# EXECUTIVE SUMMARY

## RATIONALE

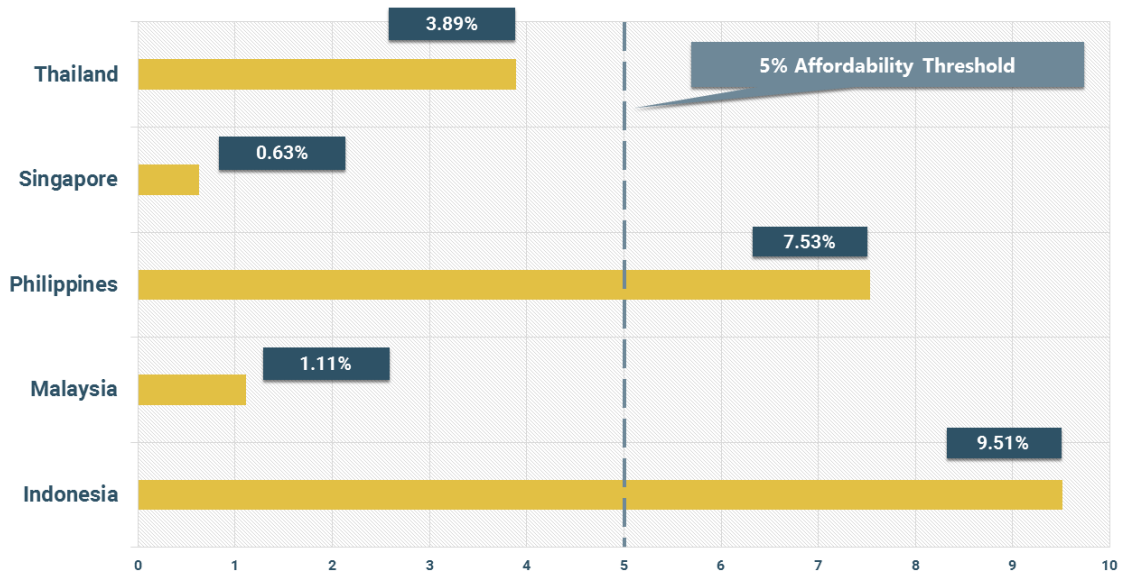
Despite the notable progress in the country's overall internet performance, the Philippines lags behind its peers in terms of affordability, availability and speed of internet access. In the Global Information Technology Report (GITR) 2016 of the World Economic Forum (WEF), the Philippines, among the ASEAN-5 countries, falls behind in terms of affordability of information and communication (ICT) Services (Figure 1). GITR 2016 has also shown that the Philippines was outperformed by its ASEAN-5 counterparts in terms of Infrastructure, Policy and Regulatory, Environment, and Business & Innovation Environment.



**Figure 1.** Network Readiness Index of ASEAN-5 Countries: In Detail

Source: Global Information Technology Report 2016. World Economic Forum.

Relative to the percentage of average monthly Gross National Income (% GNI) per capita, International Telecommunication Union (ITU) reported that the affordability of entry-level broadband services in the Philippines lies above (as shown in Figure 2) the five (5) percent threshold set by the United Nations (UN) Broadband Commission.



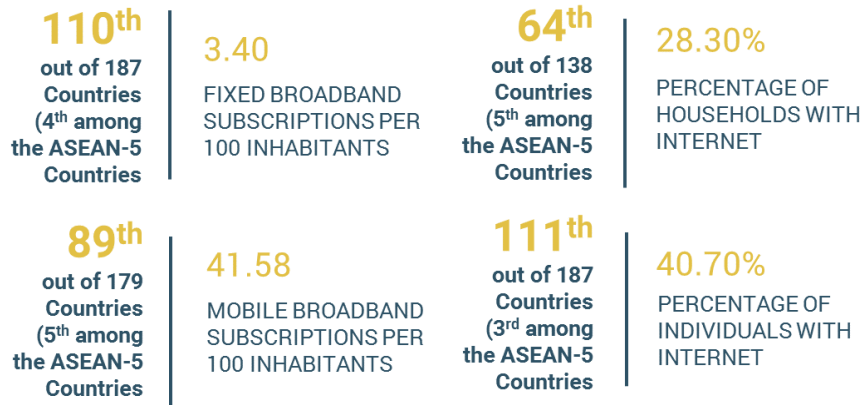
**Figure 2.** Affordability Levels of Broadband Services in the ASEAN-5 Countries

*Source: Measuring Information Society 2016, International Telecommunication Union.*

In terms of disaggregated levels of internet penetration, the Philippines still falls behind its ASEAN-5 and global counterparts, despite the significant number of Filipinos using broadband internet. The UN Broadband Commission reported that the Philippines, compared to its global peers, has ranked 110<sup>th</sup> in terms of fixed broadband penetration, 89<sup>th</sup> in mobile broadband penetration, 64<sup>th</sup> in percentages of households with internet, and 111<sup>th</sup> in percentages of individuals with internet.



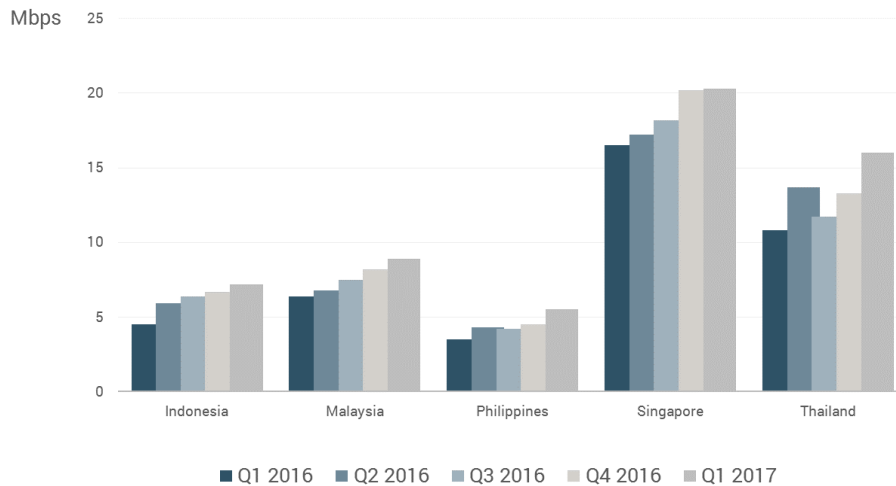
## EXECUTIVE SUMMARY



**Figure 3. Penetration Levels of Broadband Services in the ASEAN-5 Countries**

Source: *The State of Broadband: Broadband Catalyzing Sustainable Development (2016)*, UN Broadband Commission

Furthermore, in terms of broadband speed, the country has continuously been outperformed by its counterparts in the ASEAN-5, according to the State of the Internet Connectivity Reports 2015-2016 of Akamai. Notably, though the average speed of the internet in the Philippines is steadily increasing, the graph (Figure 4) shows the gap that the country needs to close to remain at par with the other ASEAN-5 Countries.



**Figure 4. Average Internet Speeds in ASEAN-5 Countries**

Source: *State of the Internet Connectivity Reports 2015-2016*. Akamai

## EXECUTIVE SUMMARY

To respond to the clamor of the public for faster and cheaper internet, Philippine President Rodrigo Roa Duterte, in his State of the Nation Address (SONA) last July 2016, directed the Department of Information and Communications Technology (DICT) to develop the National Broadband Plan (NBP), which will serve as a blueprint in the acceleration of the deployment of fiber optic cables and wireless technologies thereby improving the Internet speed in the country. By virtue of Republic Act 10844, the DICT has become the primary policy, planning, coordinating, implementing, and administrative entity of the Executive Branch of the government that will plan, develop, and promote the national ICT development agenda, and enviably tasked with implementing one of the key deliverables of the Philippine Digital Strategy (PDS) 2011-2016 -- to craft and implement a national broadband policy to accelerate broadband infrastructure deployment and improve public access.

This Plan is structured into five (5) major parts that will examine, define, and limit the scope of issues, key supply-side and demand-side strategies, and initiatives to address gaps in the broadband environment particularly on accessibility, affordability and quality of broadband services, as well as existing policy and regulatory issues that hinder infostructure deployment. Further, the NBP will lay down approaches in engaging the public and private stakeholders to guarantee the realization of universal access of broadband in the country.

### WHAT WE WANT

The NBP envisions the following:

*“A resilient, comfortable and vibrant life for all, enabled by open, pervasive, inclusive, affordable, and trusted broadband internet access.”*

Consistent with Executive Order No. 5, s. 2016 approving and adopting the twenty-five-year long term vision ‘Ambisyon Natin 2040,’ the above statement reflects the government’s vision to raise the Filipinos’ living standards and subsequently, eradicate poverty through the provision of strategic, reliable, cost-efficient, and citizen-centric infostructure. The government will empower the lifestyle of the Filipinos through a broadband Internet access that is:

- ✓ **Open** - Broadband is developed through an innovative, multi-stakeholder approach taking into consideration the emergence of policy and regulatory challenges
- ✓ **Pervasive** - Complemented by emergent wired and wireless broadband technology solutions, access to the Internet is available anytime, anywhere
- ✓ **Inclusive** - Broadband is relevant and accessible to all segments of the society, including the marginalized sectors

## EXECUTIVE SUMMARY

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- ✓ **Affordable** - Broadband internet access is financially-accessible and worth paying for
- ✓ **Trusted** - Users can confidently access internet in a fast, reliable, and secure manner

In consonance with this vision, the government **will set policy, regulatory, and infostructural interventions** to **spur competition** in the telecommunications and ICT industry and **ensure availability, affordability and quality** of broadband internet access. Toward these ends, the government, through the strategies set on the plan, will focus on the realization of the following outcomes:

### a) **Accelerated Investment**

The government will develop responsive policy and regulatory issuances and provide necessary interventions and incentives to accelerate investment, particularly in the countryside. This will entice the existing and new market players to invest in unserved and underserved areas and provide better services to the currently serviced areas.

### b) **Mobilized and Engaged Public and Private Sectors**

The government is to forge strategic partnerships and engagements with private sector and industry players, civil society organizations, and academe, by laying down mechanisms, such that these entities can take part in the development of the telecommunications and ICT sector.

### c) **More Places Connected**

This outcome will set initiatives or interventions to connect government agencies, schools, health institutions, Micro, Small and Medium Enterprises (MSMEs), among others to broadband infostructure. It also aims to ensure the efficient management of spectrum and the adoption of satellite and emerging technologies in broadband deployment.

### d) **Increased Take-up Rate**

This will be brought into fruition by the provision of programs that will stimulate the demand for broadband such as: promotion of the use and production of local content and applications; conduct of digital literacy programs; and introduction of fiscal incentives to broadband users, among others.

### WHAT TO DO

#### 1. Policy and Regulatory Reforms

With the rapid development and advancement in the telecommunications and ICT sector, existing frameworks governing this industry should undergo reforms to cope with the new trends in technologies. Given this situation, the government will focus on review and amendment of relevant laws, policies, and regulatory issuances including, but not limited to the following:

**a. Commonwealth Act No. 146 (Public Service Act)**

To make this act more responsive to the needs of time, policymakers should focus on the revision of its penal provision, exempting telecommunications and value-added services from the public utilities stipulated in this act. This may, therefore, ease ownership restrictions required by the Philippine Constitution and remove the need for securing a legislative franchise before putting up a network.

**b. Republic Act 7925 (Public Telecommunications Policy Act)**

The act should consider the following amendments and revisions: (1) Strengthen roles of DICT and NTC in upholding competition by redefining the market structure set by this act; (2) Make the act responsive to technology advancements (i.e. shifting from telephone to internet paradigm); and (3) Set specific clauses to ensure consumer rights protection, among others.

**c. Republic Act 3846 (Radio Control Law)**

Review the need of a congressional franchise to operate a telecommunications and ICT network.

**d. Article XII, Section 11 of the 1987 Constitution**

Consider the review and amendment of this provision to accelerate investment in telecommunications and ICT

**e. Guidelines on the Procurement of Orbital Slots and Frequency Registration of Philippine Satellites**

The government will update these guidelines in adherence to the radio regulations set by the ITU Radiocommunication (ITU-R) Bureau, such as administrative fees and orbital slot coordination procedures. The update will also include space-segment requirements in lieu of the usage or assignment of the planned PHL satellite orbital slots.

Moreover, the government should collaborate with the legislative body to pursue the passage of the following, among others:

- a. Open Access and Peering Policy
- b. Universal Access Fund
- c. Streamlined and Harmonized Broadband-related Permits, Fees, and Process
- d. Dig Once Policy
- e. Guidelines for Infrastructure Sharing
- f. Adoption of National Broadband Plan
- g. Convergence Law

## 2. Investment on Broadband Infrastructure

For the furtherance of the NBP, the establishment of the Philippine Integrated Infostructure (PhII) is proposed to address the bottlenecks in backbone and backhaul segments, as well as to serve the augmentation of bandwidth requirements of today's digital society.

To implement the PhII, the government will address the lack of market capacity for implementation within the required timeframe and will avoid infostructure surplus while building the network. Careful consideration between the scope variant and commercial strategies on direct government build and operation, PPP arrangement, and subsidized investment will be undertaken to establish a PhII. This may necessitate one or several public-private partnership (PPP) agreements to deliver new infrastructure and services.

The PhII will provide a demand responsive core and aggregation network for national government agencies (NGAs), local government units (LGUs), public elementary and secondary schools, state colleges and universities (SUCs), public hospitals and rural health units (RHUs), among others located in the identified growth centers. It will also leverage the existing government assets and initiatives such GovNet, IGovPhil, Free WiFi in Public Places, and Tech4ED to further lower implementation costs.

Toward these ends, PhII is expected to provide at least 10 Mbps of internet download speed to cover households by 2020 affordably. This infostructure intervention will aid the government in developing new market opportunities and use cases, thus realizing the following:

- a. **Inclusive and Pervasive Broadband Connectivity** – Broadband internet service is accessible to all segments of the society, anytime, anywhere.
- b. **Unified Government** – Government services are delivered through integrated and interoperable ICT network systems

- c. **Smart Countryside**– Rural areas are developed through the promotion of e-platforms such as distance learning, telehealth, and telecommuting.

### **3. Government Support to Stimulate Broadband Demand**

In order to sustain the momentum of pervasive infostructure development, the government will establish necessary “pull” measures to stimulate demand, and eventually increase broadband take-up rate. These include programs and interventions that will focus on the following:

#### **a. Local Content Development and Promotion**

For the sustenance of pervasive development of telecommunications and ICT infostructure, the government will support the development of local content and applications by providing necessary interventions, such as the provision of incentives to local content developers from the inception, incubation and marketing of the content and applications. Likewise, the government can also take into account the provision of necessary policy and regulatory interventions to develop favorable environments for content and application.

Furthermore, the government will also support the development of rich and useful content and applications that will aid the delivery of public services and the creation of citizen engagement platforms. The same shall be supported by the development of language Application Program Interface (API) and plugins to enable websites to offer content in English, Filipino and major Philippine dialects. In this way, government can stimulate the utilization of telecommunications and ICT infrastructure.

#### **b. Conduct of Capacity Building and Information Outreach Programs**

In moving towards a knowledge-based economy, it is essential for citizens to be equipped in using broadband services, content, and applications. With the provision of capacity building and information outreach programs, the citizens will become aware of the benefits of broadband, such as the provision of education, putting up online businesses, telecommuting, research, development, and innovation activities. The government will also consider the establishment of regional and local telecommunications and ICT training institutes to enhance and support the development and adoption of the use cases for these technologies. As such, the government can produce local talents that are equipped, as well as valuable businesses and start-ups that can contribute towards inclusive development and digital transformation.

### **Introduction of Incentives to Broadband Users**

To further narrow the digital divide, the government will establish an “access device” subsidy scheme for broadband users. This can be integrated to existing programs and initiatives of the government, particularly to programs dealing with marginalized sectors, like the 4P’s program of the Department of Social Welfare and Development (DSWD) and the online learning program of the Department of Education (DepEd).





# PART ONE:

---

# INTRODUCTION

*"I also directed the newly-created DICT to develop a National Broadband Plan to accelerate the deployment of fiber optic cables and wireless technologies to improve internet speed..."*

– President Rodrigo Roa Duterte, SONA 2016

## 1.1 RATIONALE

One of the highlights of the President Rodrigo R. Duterte's State of the Nation Address (SONA) in July 2016 is the directive to the newly created Department of Information and Communications Technology (DICT) to develop a National Broadband Plan (NBP) to accelerate the deployment of fiber optic cables and wireless technologies to improve internet speed. As envisaged in the Philippine Digital Strategy (PDS) 2011-2016, the crafting of a National Broadband Plan seeks to address key supply-side and demand-side initiatives to achieve the country's sustainable development goals through information and communications technologies (ICTs).

Consumers and businesses value broadband connectivity with devices capable of delivering effective applications and useful content or information. With NBP, the government can influence the broadband ecosystem through issuance of policies to ensure fair competition, consumer welfare, innovation and investment, efficient allocation and management of assets; and reform existing laws, polices and standards to maximize the benefits of broadband services in all sectors of the society.

This document provides background, contextual information and strategies, to assist stakeholders to better understand and appreciate the government initiatives of improving access to information and delivery of public services using broadband technologies.

### 1.1.1 What is Broadband?

Broadband is high speed access to the Internet. Broadband is important to individuals and businesses to be able to access information faster and perform online transactions conveniently using the internet.

In the context of Memorandum Circular 07-08-2015, the National Telecommunications Commission (NTC) defines entry-level broadband as a data connection speed of at least 256 Kilobits per second (Kbps). On the other hand, the International Telecommunication Union-Telecommunications Standardization Sector (ITU-T) defines broadband as a transmission capacity that is at least 1.5 or 2.0 Megabits per seconds (Mbps).

Under the National Broadband Plan, entry-level broadband connection to the internet must have a minimum speed of 2.0 Mbps. Broadband connection and services with capacities below the minimum speed may continue to be provided, but will not count for purposes relating to target setting, performance assessment, or the measurement of service penetration. The minimum download speed that is recognized as entry level broadband will undoubtedly increase over time, to reflect changes in technology capabilities and user expectations.

### 1.1.2 Why Broadband?

Broadband is a key enabler of economic growth and competitiveness of nations that can contribute to social and cultural development. The availability of quality, affordable broadband services in the Philippines is essential to facilitate innovation, economic growth, and development, and to reinforce social inclusion and cultural norms. The benefits of broadband continue to expand in the following areas: <sup>1</sup>

- *Economic transformation* in the national and sectoral levels, and necessary adaptation of public and private sectors to meet the challenges and imperatives of operating in the global economy. Broadband will transform the way in which transactions are conducted and will redefine the value and supply chains and the relationships of the parties in such chains.
- *Productive efficiency* as business and government processes are made more effective. In particular, broadband will help improve access to information and the cycle times for various processes in the economy. Transaction costs will be decreased and wastefulness associated with existing processes will also be further reduced.

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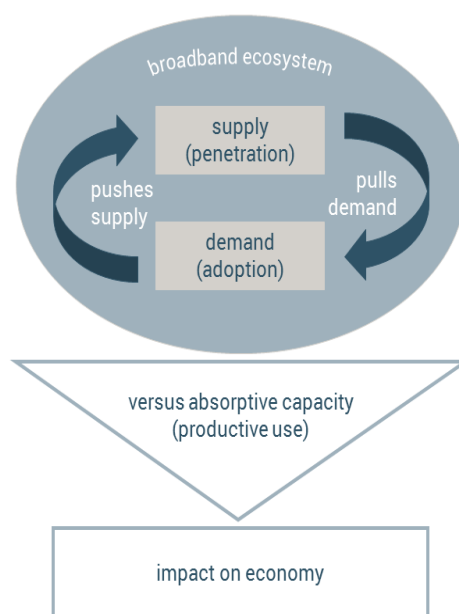
<sup>1</sup> Based from the developed draft National Broadband Policy of Information and Communications Technology Office (now Department of Information and Communications Technology) and International Communication Union (ITU).

## PART ONE: INTRODUCTION

- *Improved public administration and service delivery* through the development of e-government online transactions to improve quality, to save cost, and increase access and convenience. More people will be able to access more government services more often and more efficiently.
- *Social inclusion* as people build and reinforce communities online, and support the reach, connections and interactions of individuals and groups.
- *Unlimited opportunities* for personal development and acquisition of new skills.
- *Greater acquaintance* with and experience of the external environment in both education and leisure.
- *Reinforcement and preservation of culture and cultural norms.*
- *Development of new products, services, and applications* to enrich the cultural, social and business life of the Philippines.
- *Realization of potentials in a digital economy.*

### 1.1.3 How Should Broadband Development Be Supported?

As shown in the figure, broadband can be viewed as an ecosystem of mutually dependent and reinforcing components of supply and demand. Taking this approach would help to encourage *the development of coherent, integrated policies* that maximize the benefits of broadband across all sectors of the economy and aspects of society.



**Figure 5.** The Broadband Ecosystem and Its Impact on the Economy

Source: Kim, et al, *Building Broadband*, World Bank, 2010.

This broadband ecosystem suggests the necessity of designing policies and programs focused on the different components of the ecosystem. The government needs to develop “push” measures that promote broadband supply, as well as “pull” measures focused on building demand. Such pull measures can promote digital literacy, establish enabling environments (including an appropriate legal framework), and foster the development of applications (including local content).

Studies conducted by World Bank to identify barriers to Internet adoption revealed primary reasons the respondents cited for not subscribing to broadband services and can be grouped into four main categories: 1) broadband is not relevant; 2) equipment or service is too expensive; 3) lack of training or comfort with using broadband Internet services; and 4) broadband is not supplied.

## **1.2 CONTEXTUALIZING BROADBAND**

### **1.2.1 Demographic, Political and Economic Landscape**

The Philippines is a Southeast Asian country in the Western Pacific, comprised of more than 7,600 islands. It is an archipelagic country divided into 3 major island groups, namely: Luzon, Visayas, and Mindanao.

Considered as one of the most dynamic economies in the East Asia region, the Philippines has been, on average, growing above 5% GDP in the past decade, with high growth of above 6% average in the past three years. With the recent change in administration, the country sees a renewed sense of vigor among industries rallying, constituting one of the fastest growing economies in Asia, with emphasis on ensuring ease of doing business and allowing for efficient delivery of government services to the public backed by technological innovations. The first SONA of President Rodrigo Roa Duterte highlights the primed recourse to technology to aid the process of permitting, informed decision making and eradicating corruption.

Based from the results of Philippine Statistics Authority’s (PSA) 2015 Census of Population, the total population of the Philippines is 100.98 million. Of the country’s 18 administrative regions, Region IV-A (CALABARZON) has the biggest population with 14.41 million, followed by the National Capital Region (NCR) with 12.88 million, and Region III (Central Luzon) with 11.22 million. On the other hand, the Cordillera Administrative Region (CAR) has the smallest populace with 1.37 million people.

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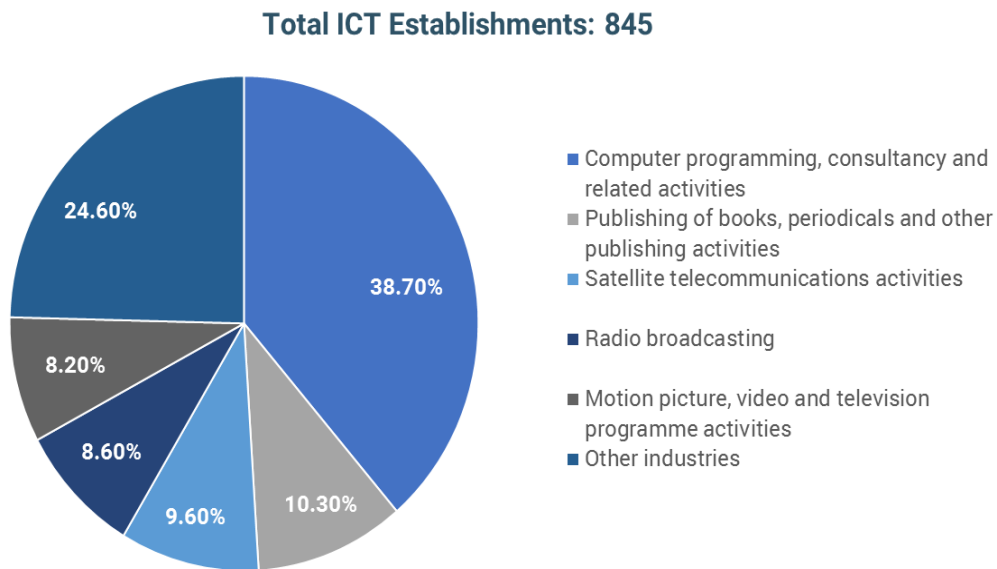
As of 30 June 2016, the country has 81 provinces, with Cavite as the most populous (3.68 million), followed by Bulacan with 3.29 million and Laguna (3.04 million), all in Luzon. A total of 24 other provinces surpassed the one million population mark (refer to Table 1 below). The country has 145 cities, 33 of which are highly urbanized, while the total number of municipalities is 1,489, 145 cities, and 42,036 barangays.

**Table 1.** Provinces with More Than One Million Population: 2015

Rank	Province	Population (in thousands)	Rank	Province	Population (in thousands)
1	Cavite	3,678	15	Isabela	1,594
2	Bulacan	3,292	16	Bukidnon	1,415
3	Laguna	3,055	17	North Cotabato	1,380
4	Pangasinan	2,957	18	Tarlac	1,366
5	Cebu*	2,939	19	Negros Oriental	1,355
6	Rizal	2,884	20	Albay	1,315
7	Batangas	2,694	21	Bohol	1,314
8	Negros Occidental*	2,497	22	Cagayan	1,199
9	Pampanga*	2,198	23	Maguindanao	1,174
10	Nueva Ecija	2,151	24	Lanao del Sur	1,045
11	Camarines Sur	1,953	25	Davao del Norte	1,016
12	Iloilo*	1,936	26	Zamboanga del Norte	1,011
13	Quezon*	1,857	27	Zamboanga del Sur*	1,011
14	Leyte*	1,752			

**Note:** \* - Excluding the population of highly urbanized cities

The Gross National Income (GNI) and Gross Domestic Product (GDP) of the Philippines during the third quarter of 2016 are 6.30% and 7.10% respectively. The Simple Literacy Rate as of 2013 is 96.50%, while the Functional Literacy Rate is 90.30 %. The Average Annual Income of a Filipino family is approximately PHP 267,000.00(Philippine Statistics Authority, Republic of the Philippines, 2016). The Philippines' Human Development Index (HDI) increased by 20% between 1980 and 2014. It ranked 115 out of 188 countries in 2014 according to the 2015 Human Development Report of UN Development Programme.



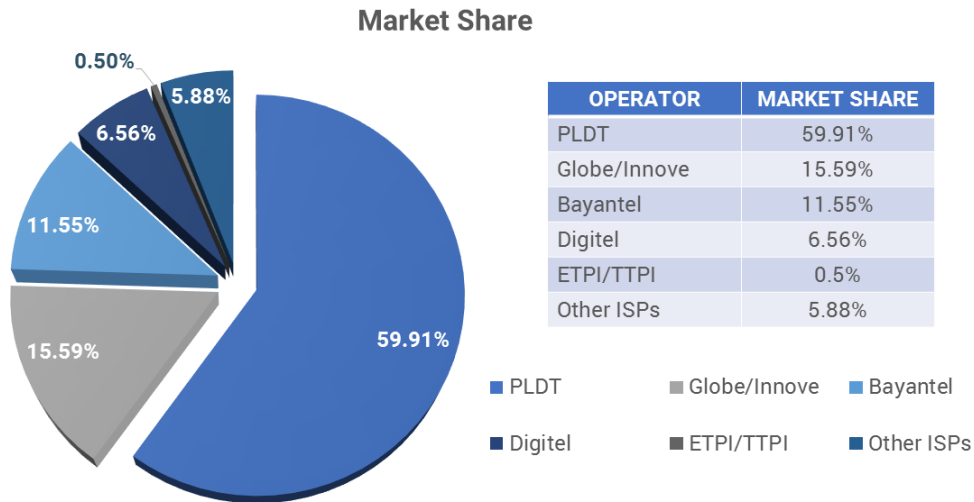
**Figure 6.** Percentage Distribution of ICT Establishments: Philippines 2013  
*Source: Philippine Statistics Authority*

Information and communications technology (ICT) is defined as “the totality of electronic means to access, create, collect, store, process, receive, transmit, present, and disseminate information.” Accordingly, ICT Sector shall mean “those engaged in providing goods and services primarily intended to fulfill or enable the function of information processing and communication by electronic means. The ICT sector includes telecommunications and broadcast information operators, ICT equipment manufacturers, multimedia content developers and providers, ICT solution providers, internet service providers, ICT training institutions, software developers, and ICT-enabled services providers (Republic Act No. 10844).”

PSA's preliminary results of the 2013 Annual Survey of Philippine Business and Industry conducted nationwide showed that a total of 845 establishments were engaged in Information and Communications technology. Computer programming, consultancy, and related activities lead the sector with 327 (38.7%) establishments. Publishing of books, periodicals and other publishing activities, as well as satellite telecommunications activities followed, with 87 (10.3%) and 81 (9.6%) establishments, respectively. Figure 6 shows the percentage distribution of establishments by industry group in 2013.

According to the National Telecommunications Commission (NTC)'s Annual Report 2013, there are five (5) major telecommunications landline operators, having installed 95.62% of the lines in the country. The remaining 4.38% of the total installed lines is attributed to the independent small players, the Local

Exchange Providers in the countryside. Meanwhile, there are six (6) authorized Cellular Mobile Telephone Service (CMTS) operators, with more than 75% of the market dominated by two (2) major carriers. For broadband, there are more than 700 registered Internet Service Providers (ISPs) as of 2013. The Philippine Long Distance Telephone Company (PLDT) dominated almost 60% of the market. Figure 7 below further illustrates the market share of the ISPs operating in the country.

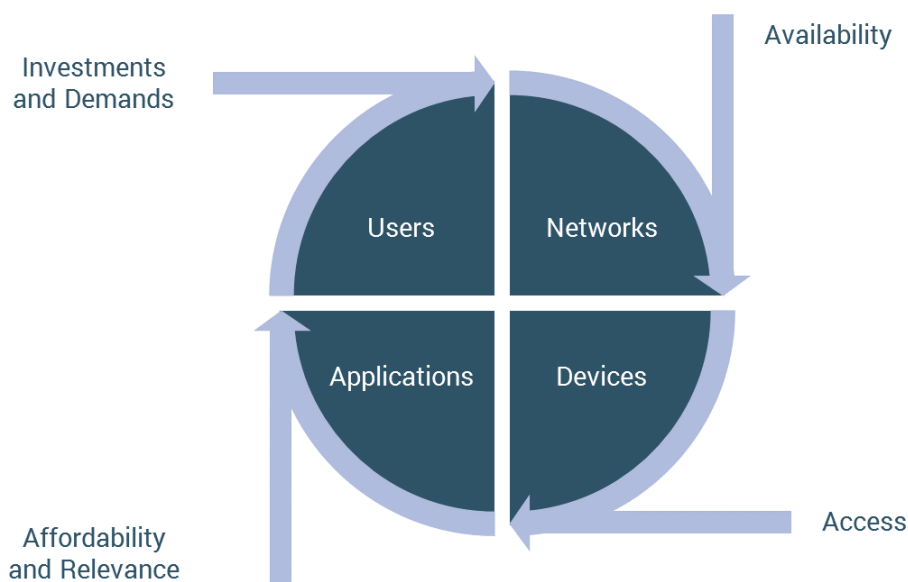


**Figure 7. Market Share of Internet Service Provider**

Source: National Telecommunications Commission (NTC) Annual Report 2013

### 1.2.2 State of Broadband Ecosystem

In most cases, the broadband ecosystem component includes broadband networks, broadband-compatible devices, broadband applications and broadband users. In Figure 8, the first three components drive each other in a virtuous cycle. Fast and reliable networks for the companies tend to produce more powerful, more capable devices to connect to broadband networks, which in turn, inspire innovators and entrepreneurs to develop new applications and useful content. These will attract not only the existing online subscribers, but will draw interest and encourage new users to subscribe to broadband services. Increase in number and sophistication of users will drive network providers to step up investments in their networks, thereby enhancing speed and functionality. These create the virtuous cycle of the broadband ecosystem.



**Figure 8.** The Broadband Ecosystem and its Key Drivers

*Source: Broadband Policy Development in Developing Countries, World Bank*

Such networks can be in the form of wired or wireless, fixed or mobile, terrestrial or satellite. Depending on the types, these networks vary in capabilities and capacities, benefits, and costs. Accordingly, internet adoption which is closely related to that of broadband infrastructure, increases as the value of being connected to these networks increases. More people and businesses choose to adopt broadband and use applications and devices that the network supports. Although, there are several factors that contribute to their decisions in using broadband, such as affordability, individual technical capability or know-how, and whether or not they believe broadband is useful.

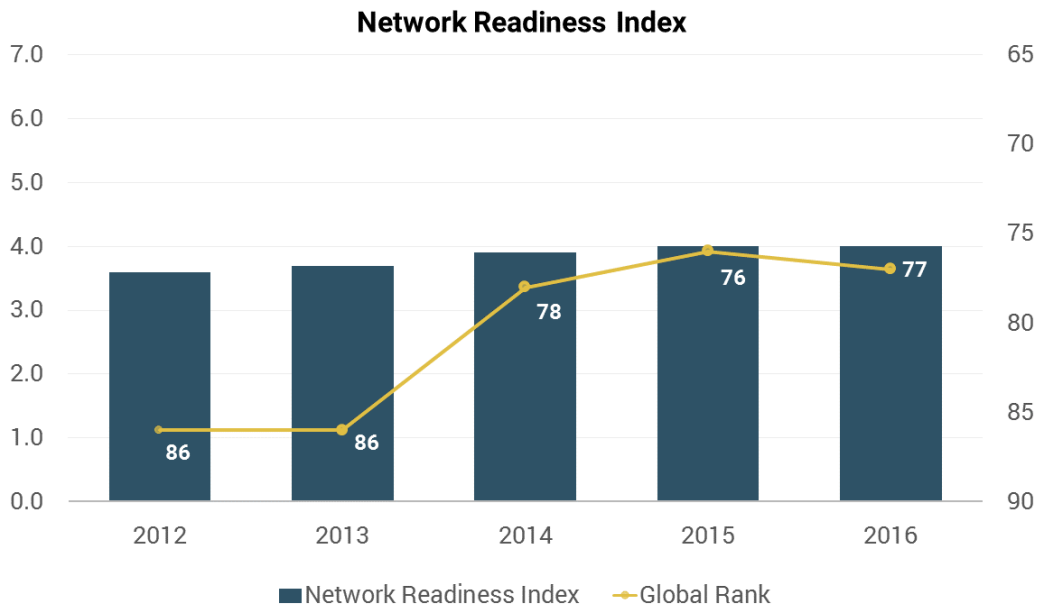
Similarly, broadband-compatible devices attached to the network enable consumers and businesses to communicate to computers, smart phones, sensors, and a lot more terminal devices, running applications and contents such as e-mails, search, sales and marketing, among others.

This section will define the country's current infrastructure, particularly international and domestic connectivity as well as access devices. Existing policies and regulations related to broadband will be discussed as basis in designing and reforming new ones. This section will include current issuances, licensing and permitting frameworks, spectrum management, peering and competition, as well as network security and critical infrastructure protection.



## Networks

With the private sector players continuing to lead and invest in developing the country's ICT infrastructure, there are notably rapid improvements in the availability of telecommunications services in the country. Figure 9 shows the Philippines' Networked Readiness Index (NRI) ranking from 2012 to 2016. The Philippines slipped from 76th in 2015 to 77th in 2016.



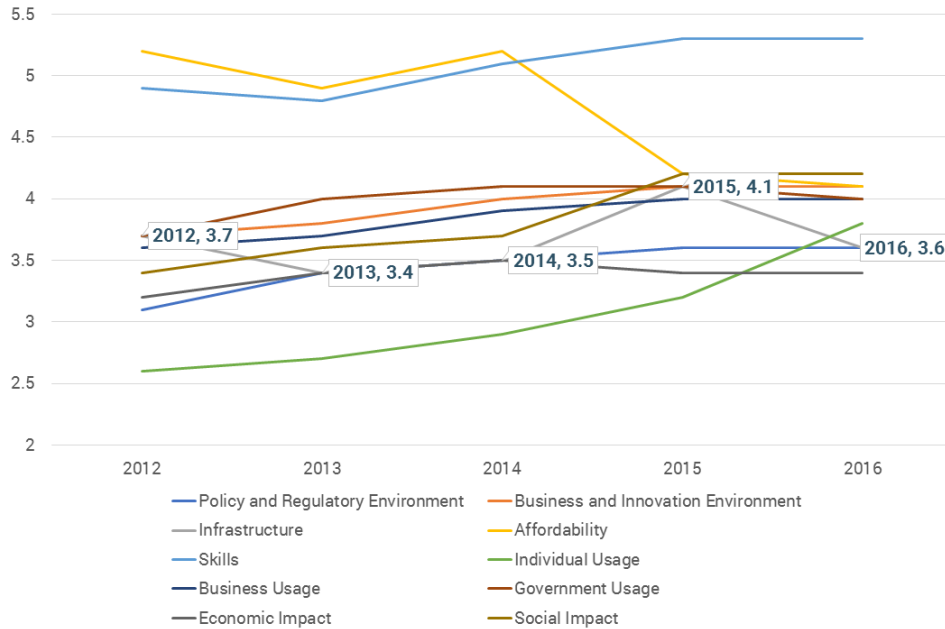
**Figure 9. Philippines' Network Readiness Index**

Source: World Economic Forum (WEF) Global Information Technology Reports (2012 - 2016)

The World Economic Forum's (WEF) Networked Readiness Index (NRI) measures the proclivity of countries to exploit the opportunities offered by ICT, as part of its annual Global Information Technology Report (GITR). It rates each country on a scale of 1 (worst) to 7 (best) on the level of countries' ICT competitiveness and well-being, and to better understand the impact of ICT (on the competitiveness) of nations. The NRI has four sub-indices, namely: 1) Environment sub index, 2) Readiness sub index, 3) Usage sub index, and 4) Impact sub index. It is composed of 10 pillars, with the infrastructure pillar being measured under the Readiness sub index.

The country's slide is due to the decline in the infrastructure pillar sub-index from 4.1 to 3.6 for the year 2015 and 2016 respectively. Refer to Figure 10.

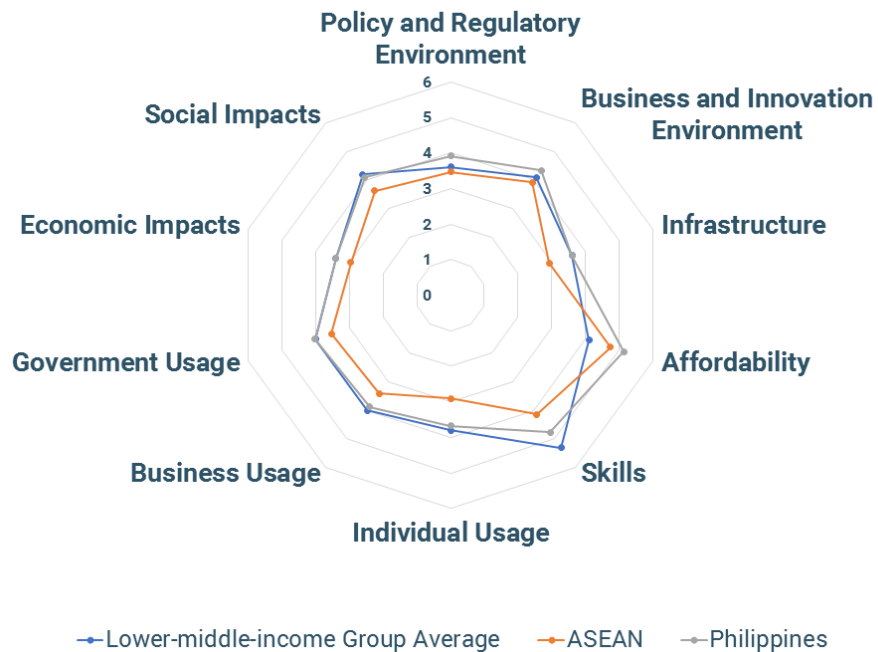
## PART ONE: INTRODUCTION



**Figure 10. Philippines' NRI: 10 Pillars Sub-indices**

Source: World Economic Forum (WEF) Global Information Technology Reports (2012 - 2016)

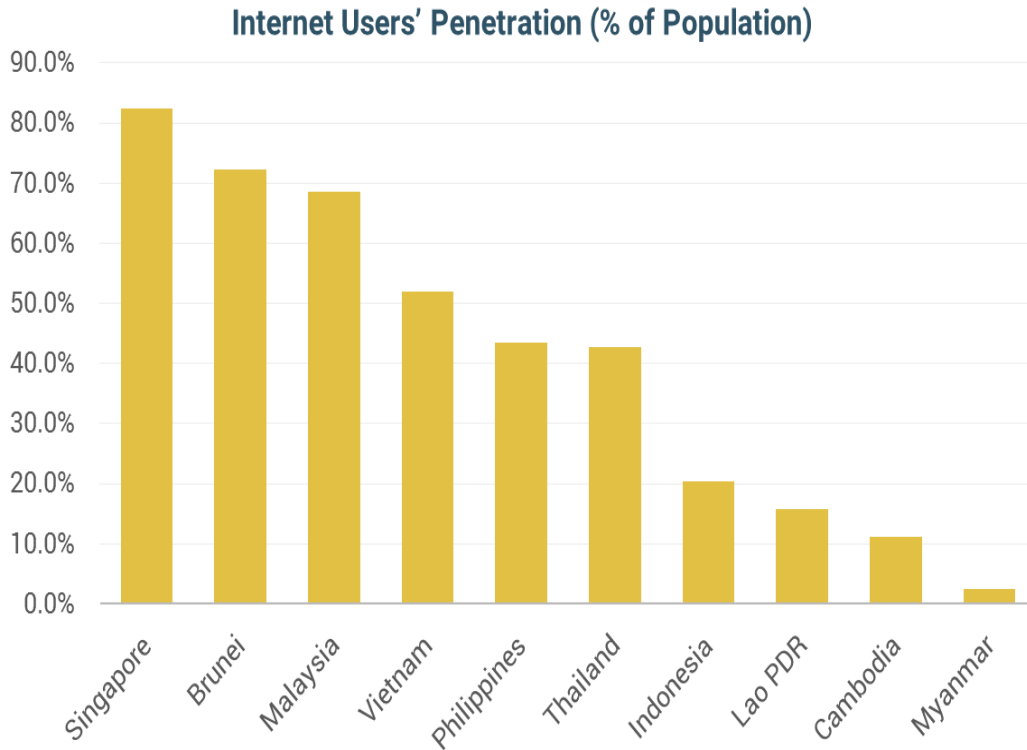
In 2016, the country belonged to the top 50% of the lower-middle-income group and its neighboring countries in ASEAN, as illustrated in Figure 11.



**Figure 11. Network Readiness Index of the Philippines vs LMI Group & ASEAN**

Source: World Economic Forum (WEF) Global Information Technology Reports (2012 - 2016)

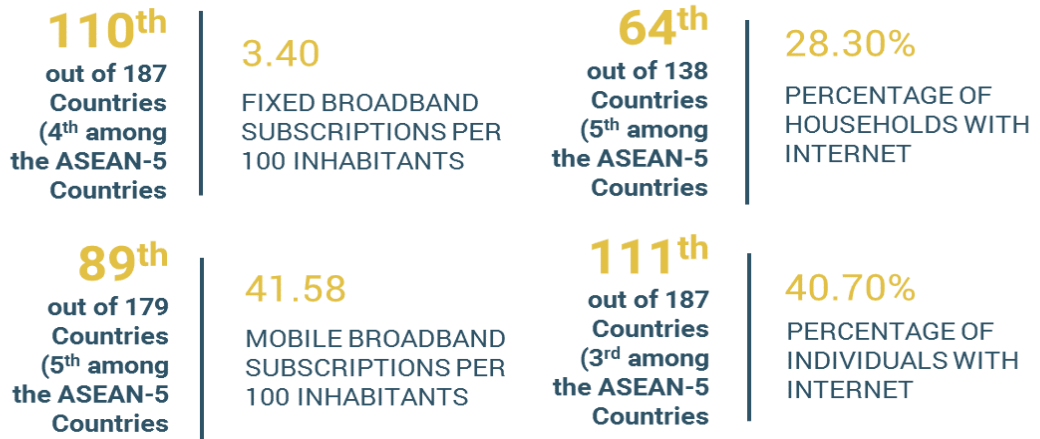
The Philippines also has the fastest growing Internet population in the world. According to Internetlivestats.com (Figure 12), from 37% in 2013, the Philippines has a 43.5 Internet penetration percentile in population as of July 2016, or the equivalent to more than 44 million Internet users nationwide. Compared to its neighboring countries, the Philippines ranked fifth on Internet penetration rate (% of population) in terms of the number of people connecting to the Internet.



**Figure 12. ASEAN Internet Users Penetration**  
*Source: Internetlivestats.com*

In terms of disaggregated levels of internet penetration, the Philippines still falls behind its ASEAN-5 and global counterparts, despite the significant number of Filipinos using broadband internet. The Broadband Commission reported that the Philippines, compared to its global peers, has ranked 110<sup>th</sup> in terms of fixed broadband penetration, 89<sup>th</sup> in mobile broadband penetration, 64<sup>th</sup> in percentages of households with internet and 111<sup>th</sup> in percentages of individuals with internet.

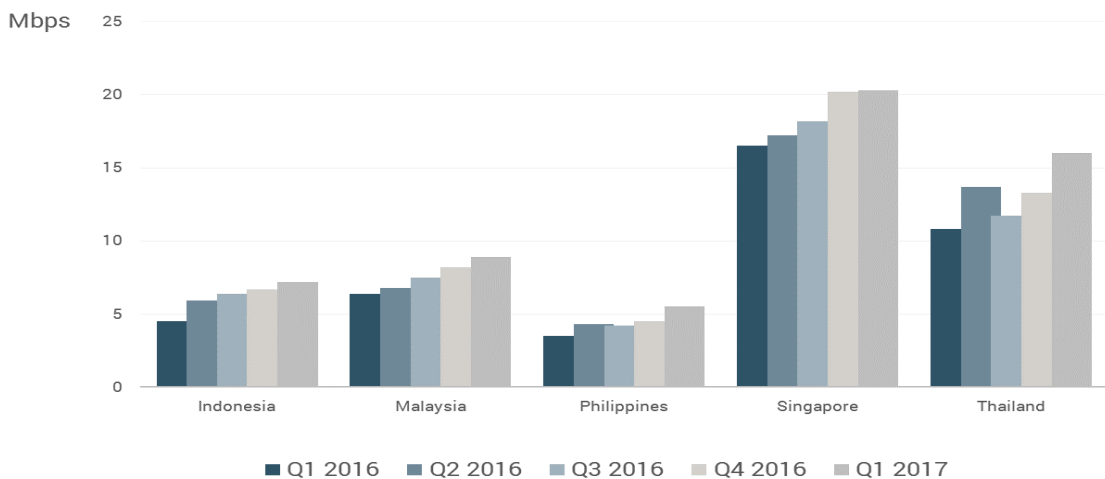
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**Figure 13.** Penetration Levels of Broadband Services in the ASEAN-5 Countries

Source: *The State of Broadband: Broadband Catalyzing Sustainable Development (2016)*, UN Broadband Commission

Further, in terms of broadband speed, the country has continuously been outperformed by its counterparts in the ASEAN-5, according to the State of the Internet Connectivity Reports 2015-2016 of Akamai. Though the average speed of internet in the Philippines is steadily increasing, the graph shows (Figure 14) the gap that the country needs to close, to remain in pace with other ASEAN-5 Countries.



**Figure 14.** Average Internet Speeds in ASEAN-5 Countries

Source: *State of the Internet Connectivity Reports 2015-2016*, Akamai

To further illustrate the overall situation of ICT in the Philippines, in the 2015 Report of the International Telecommunication Union (ITU)'s on Measuring the Information Society, the country ranked 98th on the ICT Development Index (IDI) for the year 2014. This is five steps higher compared to the country's 103rd IDI ranking in 2013. The Philippines ranked 15th in the Asia and the Pacific Region.

The IDI has three sub-indices, namely: 1) access, 2) use, and 3) skills. ICT Access includes fixed-telephone subscriptions per 100 inhabitants, mobile-cellular telephone subscriptions per 100 inhabitants, international Internet bandwidth per Internet user, percentage of households with a computer, and percentage of households with Internet access. ICT use covers the percentage of individuals using the internet, fixed (wired)-broadband Internet subscriptions per 100 inhabitants, and wireless-broadband subscriptions per 100 inhabitants. ICT skills measures adult literacy rate, secondary gross enrolment ratio and the tertiary gross enrolment ratio in each economy.

The mobile operators have been key in the country's mobile Internet growth. Despite being known in recent years as the "texting capital of the world", the Philippines' increasing shift to mobile Internet usage resulted in the decline of the use of Short Message Service. This, however, has led to the Philippines becoming known as the "social networking capital of the world". Based on the OpenSignal's State of LTE Report Q3 2016, it showed that 68.63% of Internet users can access a 3G or 4G (or better availability) signal in the country. Further, OpenSignal measurement revealed that users in the country were connected to the Wi-Fi rather than cellular networks 44.14% of the time.

### **International Connectivity**

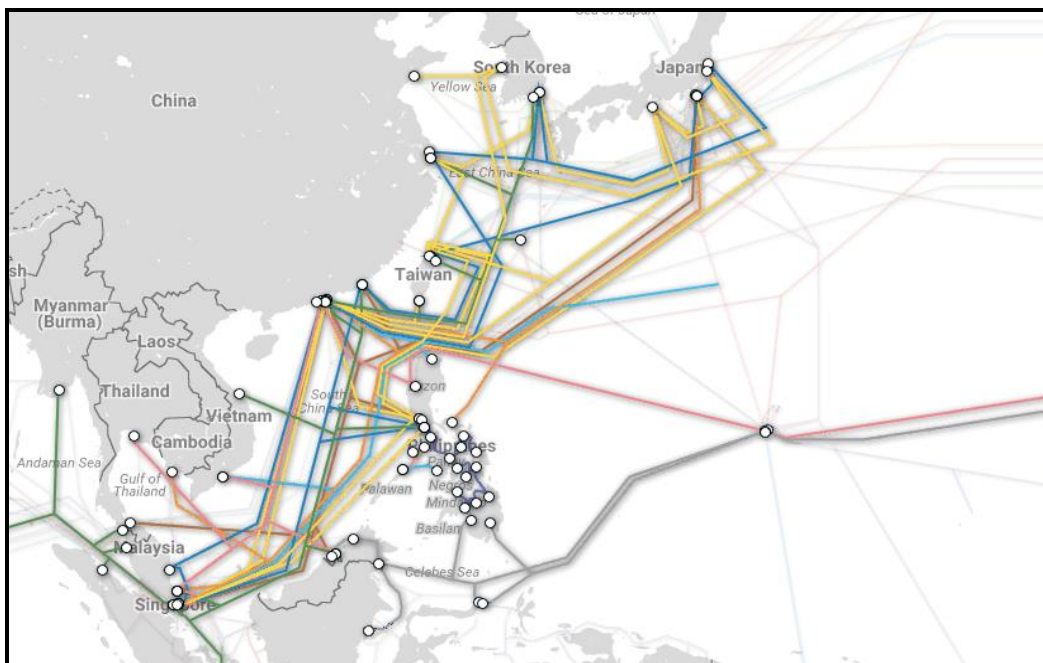
Movement of people, commerce and data across the world's border now becomes more fluid. As such, the Philippines like many other countries has been drawn to improve its international networks and access around the world. In the McKinsey Global Institute Digital Globalization Report (March 2016) on Connectedness Index, the Philippines ranked 54th overall among 139 countries, far behind Malaysia (20th), Thailand (22nd), Vietnam (37th) and Indonesia (51st). The Philippines ranked 67th in data, just behind by a few points from Thailand (64th) and Vietnam (61st), but ahead of Indonesia (76th). The McKinsey Global Institute (MGI)'s Connectedness Index examines how the countries participate in globalization based on inflow and outflow of goods, services, finance, people and data.

Unlike many of the ASEAN countries, the Philippines has no international terrestrial borders. As an archipelago of more than 7000 islands, the Philippines' international access and connectivity is supported mainly by submarine cable systems. Overall, as of first quarter of 2016, there are seven (7) international

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submarine cable landing stations which are operational (active) in the country. PLDT operates four (4): a) South East Asia–Middle East–Western Europe-3 (SEAMEWE-3) with a landing station in Batangas, b) Asia Pacific Network - (APCN-2) with a landing station also in Batangas, c) Asia Submarine Cable Express (ASE) and CAHAYA Malaysia with a landing station in Daet, Camarines Norte, and d) Asia-America Gateway Cable Systems (AAG) with a landing station in La Union. Globe Telecom operates two (2): a) Tata TGN Intra Asia (TGN-IA) with landing stations in Ballesteros, Cagayan, and b) Southeast Asia Japan Cable (SJC) with a landing station in Nasugbu, Batangas. Telstra and Pacnet operates East Asia Crossing (EAC-C2C).

Meanwhile, there are two submarine cable systems in plan - the BIMP EAGA Submarine Cable System (BEST Cable) and the Southeast Asia-US submarine cable (SEA-US), with planned landing stations in Davao and Parang, Maguindanao respectively. Figure 15 shows the international submarine cables with landing stations in the Philippines (including the planned submarine cable).



**Figure 15.** Submarine Cable Systems with landing Stations in the Philippines  
*Source: Telegeography.com*

According to the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) study in 2012, the Philippines has an International Internet bandwidth of 530 gigabits per second (Gbps). The International Internet bandwidth per internet user based on the ITU data as of 2014 is 27.688 kilobits per second (kbps). Table 2 shows the system's design and lit capacity for both active (in service) and planned international submarine cable systems with landing stations in the country.

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**Table 2.** International Submarine Cable Systems with Landing Stations in the Philippines

Cable System	Route (km)	Landing Station	Host	System Capacity (Gpbs)	
				Lit	Design
<b>In Service</b>					
SEA-ME-WE-3	39,000	Batangas	PLDT	133	1,100
EAC-C2C	19,000	Cavite & Batangas	Telstra	3,260	30,550
APCN-2	19,000	Batangas	PLDT	7,360	13,200
TGN-IA	6,700	Cagayan	Globe	1,900	9,600
AAG	20,318	La Union	PLDT	5,162	11,000
ASE	7,800	Camarines Norte	PLDT	1,580	4,900
SJC	8,900	Nasugbu	Globe	1,200	28,000
<b>Planned</b>					
BEST Cable	5,092	Maguindanao	BEST Cable Corp.	-	28,800
SEA-US	15,000	Davao	Globe	-	20,000

*Sources: Broadband Infrastructure in the ASEAN-9 Region Study by UNESCAP-Terabit Consulting (2013), Telegeography.com, SubTel Forum, PLDT records*

As shown in Table 2, majority of the cable systems terminated in the country are hosted by only two major providers, indicating less competition in the international links. The transit cost of submarine cable systems varies depending upon the status of market dynamics of a country, including competition intensity, accessibility of submarine cable, geographic location, etc.

Based on the report of Telegeography, the regional IP transit traffic price of the Philippines is lower than the IP transit prices of Thailand, but already at par with Malaysia and Indonesia.

**Table 3.** Average Monthly Cost of International IP Transit Traffic in ASEAN-5 Countries

<b>ASEAN Countries</b>	<b>Cost per Month (US \$/Mbps)</b>
Indonesia	\$21.68
Malaysia	\$21.98
Philippines	\$21.67
Singapore	\$6.72
Thailand	\$66.66

Source: *Telegeography*

To supplement submarine cable systems connecting the country globally and complement the domestic backbones, there are at least eighteen (18) satellite providers that cater their VSAT services in the country. Backed with wide-ranging satellite systems such as Thuraya, Iridium, Inmarsat, Eutelsat, IPSTAR, APSTAR, and the like, these providers deliver internet access services (data, voice and video applications) through C, Ku, Ka and other bands. Table 4 summarizes these satellite providers.

**Table 4.** Eighteen Satellite Providers in the Philippines

<b>Satellite Internet Service Providers</b>	<b>Country (Address)</b>
TS2 Space	Poland
Qantsat	Spain
Businesscomm Networks	South Africa
BellTel	Philippines
Juch-Tech, Inc.	Canada
TOPH Inc.	Philippines
DOMSAT	Philippines
Enhanced Electronics and Communications Services, Inc.	Philippines
WorkNetPhil International, Inc.	Philippines
IPSTAR	Philippines
NERA Satellite Communications	Philippines
AZ Communications Network, Inc.	Philippines
Jason Electronics Philippines Co, Inc.	Philippines
DelNet	Philippines
IXSforall	Philippines
SpaceX	California, USA
One Web	Canada and USA
We Are IT Philippines	Philippines

Source: <http://www.satproviders.com/en/list-of-all-services/PHILIPPINES>



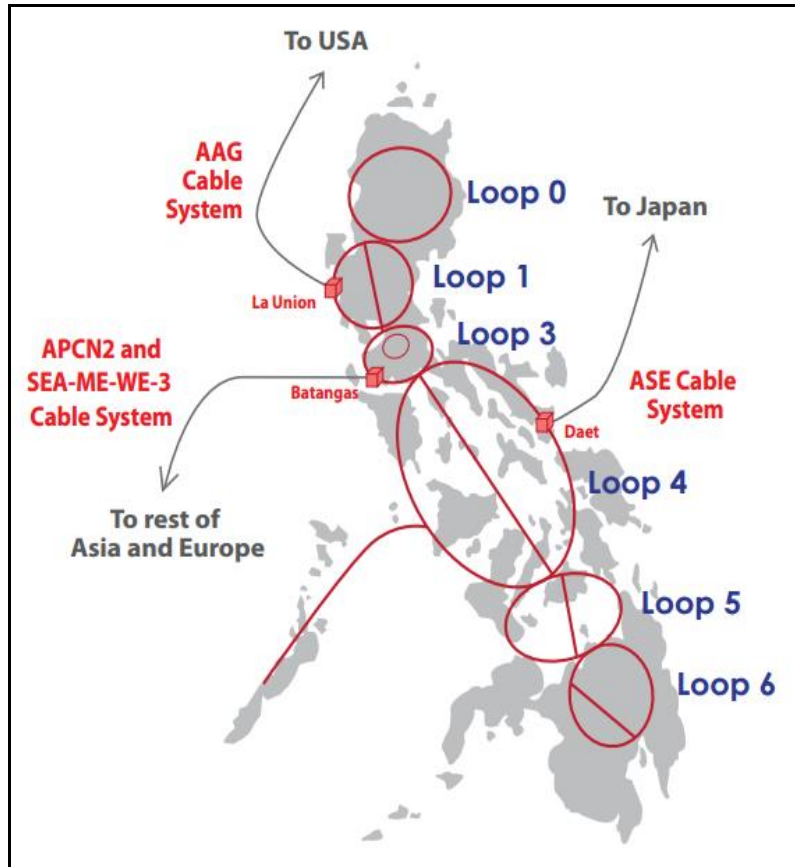
### Domestic Connectivity

Broadband distribution in the country is composed of various types of service providers - from international gateway facilities (IGFs), inter-carrier services (ICFs), local exchange carriers (LECs), cellular mobile operators and value added service (VAS) providers, down to the subscribers and public users of the broadband services.

According to the UN-ESCAP in-depth Study on Broadband Infrastructure in the ASEAN-9 Region, the Philippines is considered relatively strong in terms of domestic infostructure in 2013. This is due to high investment in terrestrial and submarine fiber optic by each of the country's major and historical operators, resulting in strong coverage, with exception in the southern part of the country (e.g. Mindanao and Palawan).

The Philippines is one of the few countries in the world that has competing national fiber-backbone infrastructure, commonly complemented by an extensive digital microwave backbone network nationwide. The backbone infrastructure comprise of PLDT's Domestic Fiber Optic Network (DFON) and Globe Telecom's Fiber Optic Backbone Network (FOBN). In addition to this is the National Grid Corporation of the Philippine's (NGCP) private telecommunication network nationwide.

The Domestic Fiber-Optic Network (DFON) is a PLDT's nationwide fiber optic backbone network (Figure 16), comprised of nodes connected by terrestrial and submarine cable links configured with ten self-healing loops and two appendages extending to Palawan and Zamboanga. The network delivers PLDT's voice, video, data, and other broadband and multimedia services nationwide. According to PLDT, the DFON loops also provide alternative segment route protection for added resiliency against single and multiple fiber breaks along the different segments. To date, PLDT's network has an approximate aggregated loop capacity of more than 7.0 Terabits per second and includes international connectivity.



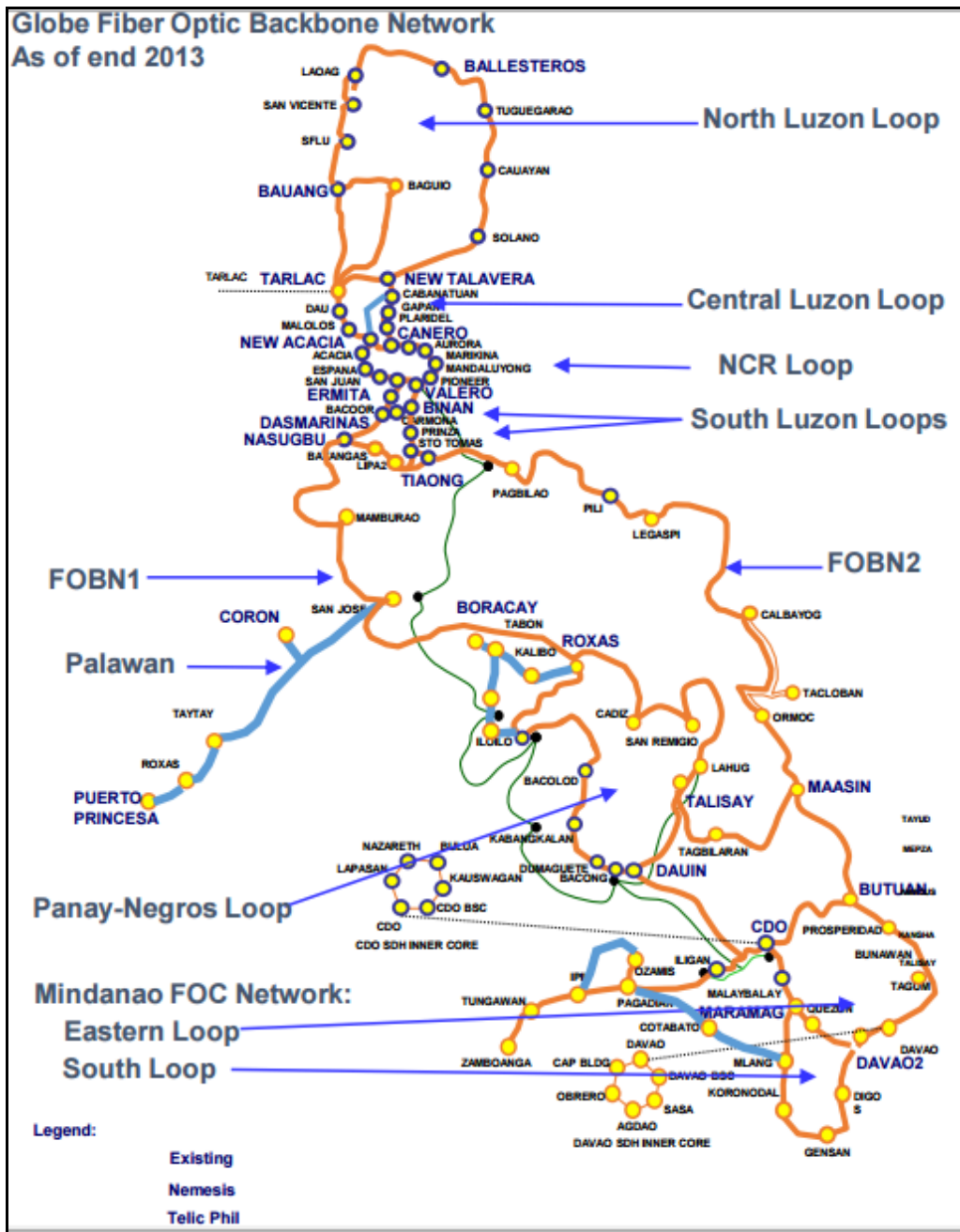
**Figure 16.** PLDT's Domestic Fiber Optic Network (DFON)

*Source: PLDT*

Complemented by a terrestrial microwave backbone network and part of the 46,316-kilometer backbone and intermediate fiber optic cable of the PLDT Group, the DFON is designed to deliver services to remote areas unreachable by the fixed terrestrial transport network.

Globe Telecom operates and maintains various fiber optic networks which includes three Fiber Optic Backbone Networks (FOBN, FOBN-2 and TELECPHIL's National Digital Transmission Network) connecting the entire Philippine archipelago. These fiber optic networks (Figure 17) span a total of 12,000 kilometers, configured in a ring, self-healing arrangement, and can be upgraded to 100Gbps per wavelength as may be needed. To complement these fiber optic networks, Globe also operates and maintains a network of digital terrestrial microwave synchronous digital hierarchy (SDH) systems nationwide.

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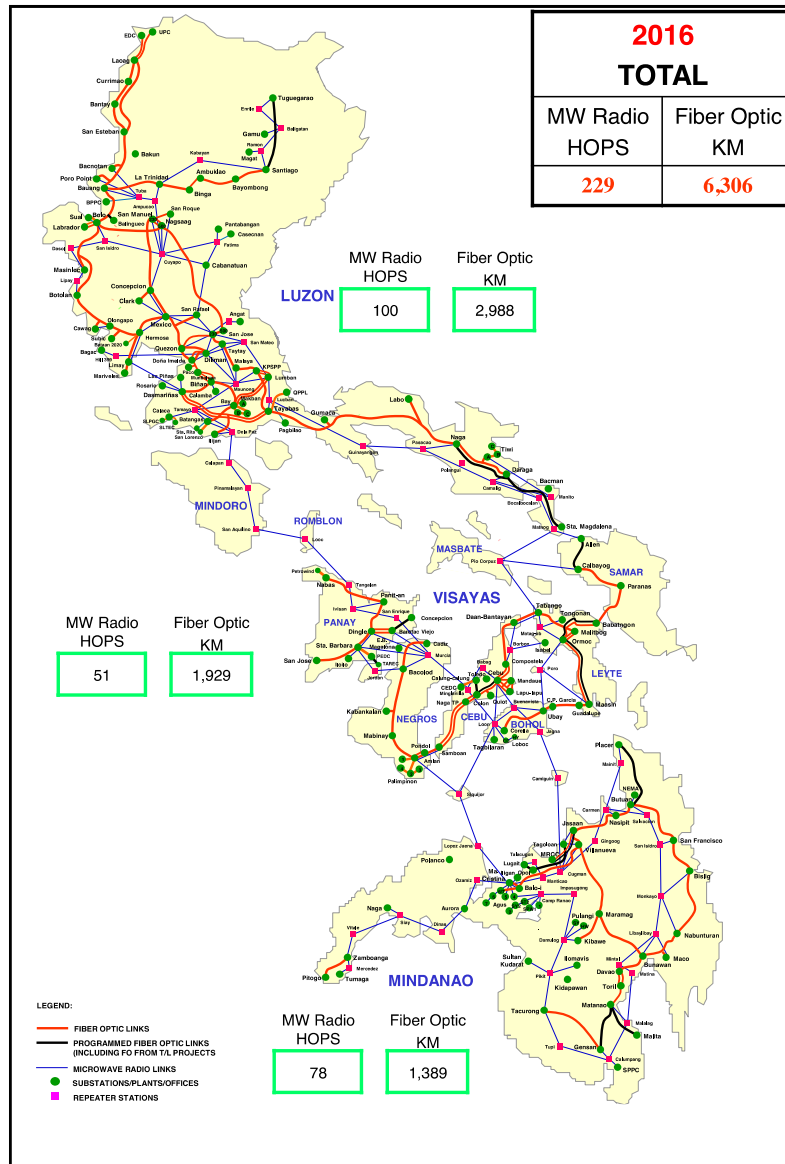


**Figure 17.** Globe Fiber Optic Backbone Network  
*Source: Globe, as of Q4 2013*

The National Grid Corporation (NGCP)'s private telecom network operates and maintains a telecom backbone supporting the operation of the electricity grid in the entire archipelago. It consists of optical paths (optical passive ground wire) along the high-voltage transmission lines and microwave radio hops which connect Luzon, Visayas and Mindanao via two (2) routes—through Mindoro in the West and via Bicol in the East. According to NGCP's Telecommunication Development Plan 2014-2015 (Figure 18), this telecom backbone operates at 2.5 Gbps (STM-16), 622 Mbps (STM-4) and 155 Mbps (STM-1) capacities.

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NGCP also maintains and operates telecom infrastructure in the form of outside plants (transmission-line-embedded) for the optical links, and its Power Line Carriers (PLC), telecom antenna towers, and radio “repeater” buildings.

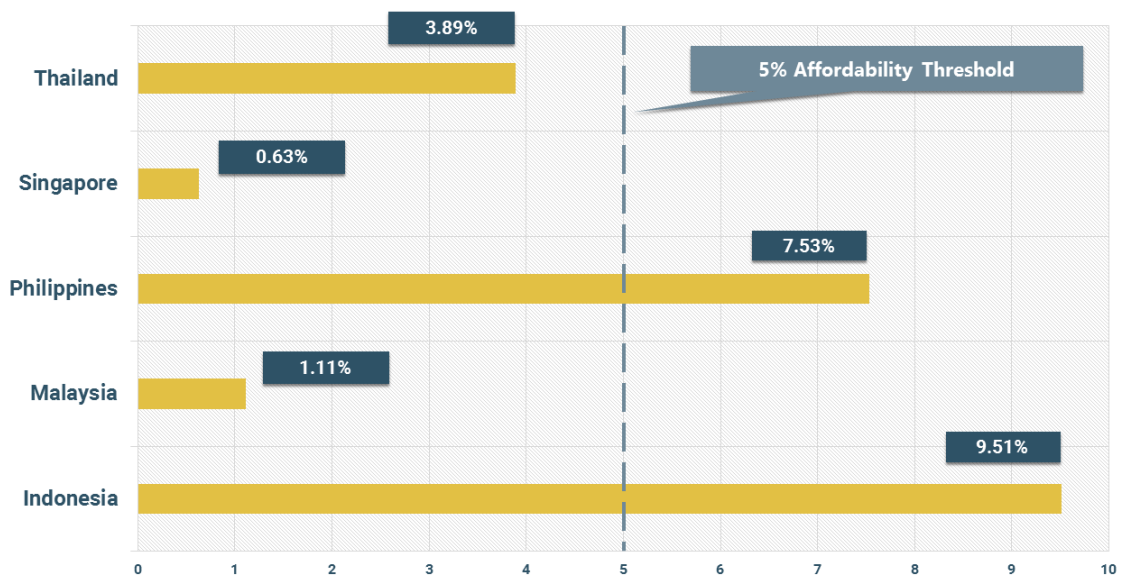


**Figure 18. NGCP Telecom Backbone Network**  
 Source: Transmission Development Plan, NGCP

## Access and User Devices

According to the 2016 Annual Report of the Broadband Commission for Sustainable Development's, the Philippines ranked 110 out of 187 countries (ITU member states) when it comes to Active Fixed Broadband Subscription, while it ranked 89 out of 179 ITU member states for active mobile subscription. The Fixed Broadband Subscription per 100 inhabitants is 3.4 in 2015. It is lower than the 41.58 active mobile broadband subscriptions per 100 inhabitants in the Philippines also of the same year. This indicates that mobile broadband access is more dominant and is used more frequently in the country as a means of access.

ITU reported that the affordability of entry-level broadband services in the Philippines falls above the five (5) percent threshold set by the UN Broadband Commission. The percentage of average monthly Gross National Income (% GNI) per capita is at 7.53%, as shown in Figure 19.



**Figure 19.** Affordability Levels of Broadband Services in the ASEAN-5 Countries  
 Source: *Measuring Information Society 2016, International Telecommunication Union*

A comprehensive study of digital, social and mobile usage around the world found that 43% of Filipinos use laptop or desktop computers to access the internet. A large portion of the population owns mobile phone which is at 87%, while 55% of the Filipino people own a smartphone. The same study shows that 47.13 million Filipinos are active internet users, and 35.7 million use mobile devices in accessing the World Wide Web. There are 75.4 million unique mobile users while total mobile connections is approximately at 119.2 million, with connections per unique mobile user at 1.58, 95 % of the users use prepaid

subscription, with 47% of the mobile subscriptions on Mobile Connection Broadband.

### **Adoption and Usage**

In terms of internet usage, 46 % of Filipinos use the internet daily, 30 % use the internet once a week, 16 % use it once a month, and 8% use it less than once per month. Further, there are approximately 48 million active social media users in the Philippines and 41 million of these access social media via mobile devices. The age group that uses the internet the most is the 20 to 29 years old age group, dominated by females, and the age group using it the least is the 60 years old and above.

Filipinos use the mobile phones for instant messaging, watching movies, playing games, mobile applications like mobile banking and mobile map. Nowadays, e-Commerce and purchasing products and services online is also commonly adopted in the country with 31% of the Filipinos visiting online retail stores, and 39 % Filipino searching for products or services online.

### **Law, Policies, and Regulatory Issuances that Govern Telecommunications and ICT**

Majority of the legal, policy, and regulatory frameworks governing current telecommunications and ICT were issued and enacted during 1990s. Some of these frameworks are as follows:

#### **Competition**

The applicable competition law was originally found in Article 186 of Act No. 3815 known as the Revised Penal Code. National Telecommunications Commission (NTC) circulars and memorandums also prevent anti-competitive actions by imposing fair pricing and practical interconnection. Recently, Republic Act 10667 or the Philippine Competition Act was signed into law. This law gave way to the creation of the Philippine Competition Commission (PCC), a newly-constituted independent quasi-judicial body mandated to implement the national competition policy, and impose the Philippine Competition Act, which serves as the primary competition law in the Philippines for promoting and protecting competitive markets.

### Ownership

In Commonwealth Act No. 146, or the Public Service Act of 1936 as amended by Commonwealth Act No. 454 and Republic Act No. 2677, wire or wireless communications systems, and wire or wireless broadcasting stations are considered as public service provided by a public utility. Section 11, Article 12 (National Economy and Patrimony) of the 1987 Philippine Constitution applies to any telecommunication entity, which states that:

*“No franchise, certificate, or any other form of authorization for the operation of a public utility shall be granted except to citizens of the Philippines or to corporations or associations organized under the laws of the Philippines, at least sixty per centum of whose capital is owned by such citizens; nor shall such franchise, certificate, or authorization be exclusive in character or for a longer period than fifty years. Neither shall any such franchise or right be granted except under the condition that it shall be subject to amendment, alteration, or repeal by the Congress when the common good so requires. The State shall encourage equity participation in public utilities by the general public. The participation of foreign investors in the governing body of any public utility enterprise shall be limited to their proportionate share in its capital, and all the executive and managing officers of such corporation or association must be citizens of the Philippines”*

### Licensing and Permit

In order to be considered a telecommunication entity, a congressional franchise and certificate of public convenience from NTC is required. Congressional or Legislative Franchise undergoes the same process as the passage of a law. Furthermore, Telecommunication entities should also comply with the necessary requirements in obtaining construction permits, radio station licenses, and other licenses and permits from the respective local government units. As stated in Section 5, Article X of the 1987 Philippine Constitution:

*“Each local government unit shall have the power to create its own sources of revenues and to levy taxes, fees and charges subject to such guidelines and limitations as the Congress may provide, consistent with the basic policy of local autonomy. Such taxes, fees, and charges shall accrue exclusively to the local governments.”*

There is no standard permit issued across local government units and this hampers the accelerated deployment of needed infostructure. Table 5 shows the permit that have to be secured.

**Table 5. Permit Requirements**

<b>National Government</b>	<b>Local Government</b>
<ol style="list-style-type: none"> <li>1. Department of Environment and Natural Resources                             <ol style="list-style-type: none"> <li>a. Certificate of non-coverage</li> <li>b. Environment clearance certificate</li> <li>c. Hazardous waste generator registration permit</li> <li>Protected areas clearance</li> </ol> </li> <li>2. Civil Aviation Board                             <ol style="list-style-type: none"> <li>a. Height clearance</li> </ol> </li> <li>3. Department of Health                             <ol style="list-style-type: none"> <li>a. Radiation clearance</li> </ol> </li> <li>4. Department of Energy                             <ol style="list-style-type: none"> <li>a. Generator set operation permit</li> </ol> </li> <li>5. National Commission on Indigenous Peoples                             <ol style="list-style-type: none"> <li>a. Certificate ensuring protection of indigenous peoples</li> </ol> </li> </ol>	<ol style="list-style-type: none"> <li>1. Building permit</li> <li>2. Occupancy permit</li> <li>3. Certificate of electrical installation (local power connection)</li> <li>4. Tower fee (ranging from P40 to P200,000 per tower per year)</li> <li>5. Zoning Clearance</li> <li>6. Special use permit</li> </ol>

### **Spectrum Management**

Radio Frequency is a limited resource that is allocated to telecommunication and broadcasting entities. Republic Act 7925 or the Public Telecommunications Act of 1995 provides that NTC is mandated to manage and award spectrum licenses to Telecommunication entities. A Spectrum User Fee (SUF) is collected by the NTC, which goes directly to the National Treasury. NTC issued a memorandum circular providing for the review, allocation and assignment of Radio Spectrum. NTC also provides the National Radio Frequency Allocation, which is based on ITU’s International Table of Radio Frequency Allocation.

### **Infrastructure Sharing and Interconnection**

NTC requires telecommunications operators and entities to negotiate and execute agreements for interconnection. It also requires the operators to publish reference access offers (RAOs) as default offers to access seekers. On interconnection charges and revenue-sharing arrangements, bilateral agreements between the concerned parties should be made and submitted to NTC. These charges are for network usage fees to direct and indirect interconnections between different networks. The NTC has the right to regulate interconnection charges as necessary in case of anti-competitive prices or collusion.



The only carrier neutral exchange in the country is the Philippine Open Internet Exchange (PHOpenIX). It allows the exchange of Internet traffic in a free-market setting between local internet and data service providers. It is currently operated, administered and maintained by the government.

### **Universal Access and Service**

The NTC recommends implementing the Universal Service Fund in the country, which can be produced through telecommunication earnings and spectrum user fees collected by the agency. Universal Service Obligations (USO) became a legal requirement in the early 1990s for International Gateway Facilities (IGF) and Cellular Mobile Telephone Systems (CMTS) operators in the form of required number of local exchanged lines or public calling offices. The Universal Access and Service Fund has not been established in the country.



## **PART TWO:**

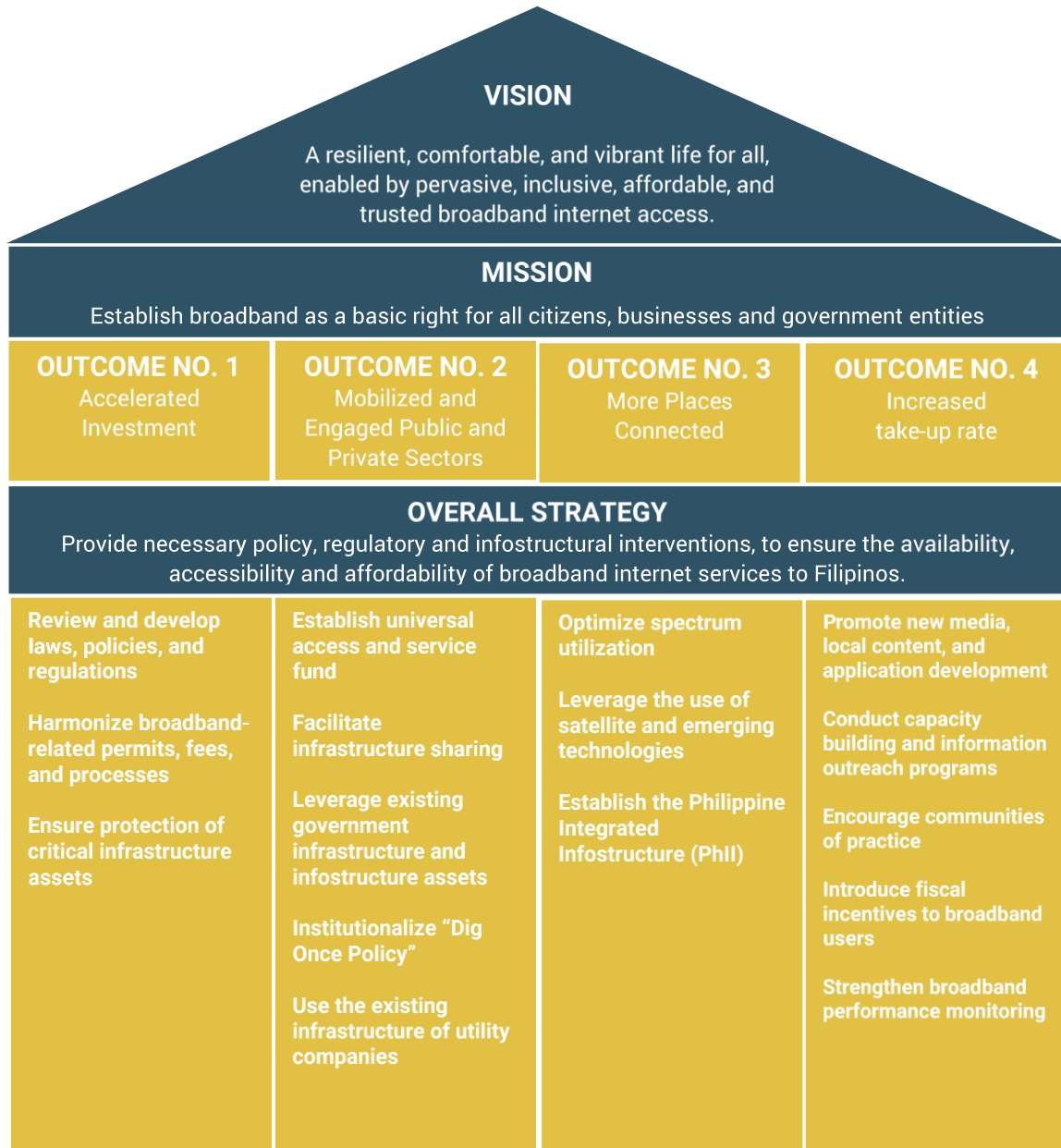
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# **REALIZING THE BROADBAND VISION**

Telecommunications and ICT play a vital role in nation building and development. By leveraging digital technologies, particularly broadband, government, businesses, and citizens can realize its widespread benefits and positive socioeconomic effects. To further these advantages, the government, through the NBP, will provide necessary policy, regulatory, and infostructural interventions, thereby ensuring the availability, accessibility, and affordability of broadband internet services to Filipinos.

In consonance with the vision set by the plan, the government will lay aggressive strategies toward the realization of the following outcomes: (a) accelerated investment; (b) mobilized and engaged public and private sectors; (c) more places connected; and (d) increased take-up rate. The strategies laid down in the plan have taken to account both demand-side and supply-side aspects of the ecosystem, guaranteeing that government will holistically address the growing needs of a digital society.

## PART TWO: REALIZING THE BROADBAND VISION



**Figure 20.** National Broadband Plan Strategic Framework

## 2.1 OUTCOME NO. 1: ACCELERATED INVESTMENT

The need for more high quality, affordable, and pervasive access becomes a primordial concern due to increasing reliance on the internet. To serve this need, the government will develop responsive policy and regulatory issuances, and provide necessary interventions and incentives to accelerate investment, particularly in the countryside. This will entice the existing and new market players to invest in unserved and underserved areas.

### 2.1.1 Review and Develop Laws, Policies, and Regulations

- **Amend Laws, Policies, and Regulatory Issuances that Govern Telecommunications and ICT**

Taking into account the rapid development and advancement in telecommunications and ICT, existing frameworks governing these sectors should undergo review and reform. Thus, the government will focus on review and amendment of the following laws, policies, and regulatory issuances tackling the issues on convergence, competition, and institutional arrangements, including, but not limited to:

Constitutional Framework:

- **Article XII, Section 11 of the 1987 Constitution**

Consider the review or amendment of this provision to allow further foreign investment in telecommunications and ICT.

Legislative Frameworks and Issuances:

- **Commonwealth Act No. 146**

To make it more responsive to the needs of time, laws shall be reformed to include substantial increase in the penalties that can be imposed by the regulators.

- **Republic Act No. 7925**

To improve the outcomes in the broadband market, the amendment of the Republic Act No.7925 is essential. The Department, in coordination with the regulators (such as NTC and Philippine Competition Commission (PCC)) and legislators will pursue the following amendments and revisions for the Act to overcome challenges in the sector:

- (a) **Grant the regulators enough tools to overcome several challenges.** The review of NTC's powers must ensure that the proper policy levers can be used to address structural and other legal issues. Reforms should include substantially increasing the penalties that can be imposed, shifting to service-based licensing and registration and removal of technology-specific licensing. Likewise, the amendment of RA 7925 should include the role of PCC in upholding competition in the telecommunications and ICT market;
- (b) **Redefine the existing market structure** to ensure competition in the telecommunication and ICT sector. Considering the fast-changing ICT landscape, industries that fall into this sector can be delineated into three categories: (1) content or applications provider; (2) network provider, and (3) service provider. By doing this, the applicability of Commonwealth Act No. 146 or the Public Service Act will be narrowed down and therefore can be opened to new local and foreign players;
- (c) **Set specific clauses to ensure consumer rights' protection.** These clauses include the provision of service level agreements and imposition of fines to the provider who fails to deliver the expected level of service;
- (d) **Provide sunset provision in the act** to maintain its responsiveness to technological advancements; among others.

- **Republic Act No. 3846**

The act providing for the regulation of public and radio communications (RA 3846) in the country shall be revisited, among others on the guidelines for the emerging players such as mobile virtual network operators. This initiative shall reduce the requirements and simplify the procedures required for the entry of market players who want to build and operate internet-based networks

Administrative Frameworks and Issuances:

- **Executive Order No. 467, s. 1998: Providing for a National Policy on the Operation and Use of International Satellite Communications in the Country**

The government shall revisit this executive order to remove the franchise requirement in accessing international satellite systems in the identified unserved and underserved areas.

- **Guidelines on the Procurement of Orbital Slots and Frequency Registration of Philippine Satellites**

The government shall update these guidelines in adherence to the radio regulations set by the ITU Radiocommunication (ITU-R) Bureau, such as on the administrative fees and orbital slot coordination procedures. The update shall also include space-segment requirements in lieu of the usage and assignment of the planned PHL satellite orbital slots.

- **Issue Open Access and Peering Policy Framework**

### **Open Access Policy**

To address interconnection issues in the broadband market, the government will develop an open access policy framework, where players are provided access to essential facilities of existing national backbone network operators under terms that are non-discriminatory and transparent, and at prices that are cost-oriented and subject to regulatory oversight by the NTC. Price bulletin will be established to support this policy.

### **Peering Policy**

In response to the clamor for faster internet, a peering framework shall be established to mandate all players to connect with each other, to maintain the local internet traffic. Towards this end, the government shall designate a National Peering Facility and instances where any players can connect. Stringent service level agreements shall also be established for players which wish to connect in the Internet Exchange Point. The government shall adopt an institutional and operational model to ensure the sustainability of this initiative, where public and private entities will benefit mutually.

- **Adopt Standards for Fiber Deployment in Residential and Commercial Areas**

A common standard for deployment in residential and commercial areas is necessary to facilitate the deployment of high quality broadband infrastructure. This standard, which is contained in the updated Philippine Electrical and Electronics Code, shall be recognized and adopted by government. The Department shall issue a circular for the adoption of this Code in future roll-outs.

### 2.1.2 Institutionalize Building Specification Ratings for Broadband

Institutionalize Building Specification Ratings for Broadband through the implementation of the Philippine Electrical and Electronics Code. This ensures and protects the rights and welfare of consumers and business users in matters relating to ICT.

### 2.1.3 Harmonize Broadband-related Permits, Fees, and Processes

In order to facilitate faster roll-out, local government units will be encouraged to streamline permits and processes by establishing one stop shop offline and online facilities. Likewise, national government may also consider the review of the following existing permits and licenses, perceived as unnecessary and redundant requirements:

**Table 6.** Permits Issued by the National Government Agencies and Local Government Units

Permits Issued by the National Government Agencies	Permits Issued by the Local Government
Department of Environment and Natural Resources (DENR) – Certificate of non-coverage, Environment clearance certificate, Hazardous waste generator registration permit, Protected areas clearance	Building permit
Civil Aviation Board (CAB) – Height clearance	Occupancy permit
Department of Health (DOH) – Radiation clearance	Certificate of electrical installation (local power connection)
Department of Energy (DOE) – Generator set operation permit	Tower fee
National Commission on Indigenous Peoples (NCIP) – Certificate ensuring protection of indigenous peoples	Zoning Clearance
Department of Public Works and Highways (DPWH)	Special use permit
National Telecommunications Commission (NTC) – Permits related to possession, ownership, purchase, importation of radio equipment, and construction of radio station, among others	



### **2.1.4 Ensure Protection of Critical Infostructure Assets**

The Department is mandated to ensure the development and protection of integrated government telecom and ICT infrastructures and designs. Thus, the government shall ensure the protection of broad infostructures consistent with the policies and guidelines enunciated in the National Cybersecurity Plan 2022 (NCSP 2022)

### **2.1.5 Introduce Incentives to New Market Players to Invest in Unserved Areas**

In adherence to the government's Investment Priorities Plan (IPP), the government shall introduce incentives to new players that will establish connectivity facilities for fixed and mobile broadband services.

Further, the government shall look into the industry of bandwidth reselling, where much opportunity exists in driving down associated network costs. Due to the landing stations being operated by only two enfranchised telecommunication operators, this provides little or no incentive for ISPs which license are grounded on reselling bandwidth and not setting up their own network infrastructure. Little leeway for innovative pricing exists and this is intensified when the ISPs offer the same set of services in a service area where telecommunication entities are also present. One might say that competitive pricing may not be applicable because of the fact that the resellers and the source are competing in the same market.

This is where much potential can be realized by introducing fiscal incentives for the ISPs in which the main audience is the countryside, where telecommunication carriers have little or no footprint. The government may provide them with the needed subsidy to roll out common network elements that can be used to drive the costs down of access relevant and competitive enough for countryside users of internet, whose demand is not as big of a magnitude as those of urban counterparts.

Majority of these ISPs are also Cable Television (CATV) operators in which their main line of business is offering content over coaxial lines straight to the home of consumers. Most of them have negotiated joint pole agreements with the electric utilities, or have set up their own, and they can easily deploy additional lines if capacitated to do so.

## **2.2 OUTCOME NO. 2: MOBILIZED AND ENGAGED PUBLIC AND PRIVATE SECTORS**

The government will forge strategic partnerships and engagements with private sector and industry players, civil society organizations and academe to deliver more inclusive telecommunications and ICT services. These can be realized by laying down mechanisms in order for entities to participate and contribute in developing the telecommunications and ICT sector.

### **2.2.1 Establish Universal Access and Service Fund or Similar Funding Option**

The government will consider the establishment of a Universal Access and Service Fund (UASF) or any other funding options, along with policies that will govern and assure fair, open, and transparent use. The UASF may be utilized to develop shared community networks in the countryside to stimulate growth, and be able to address the growing need for a digitally enabled workforce.

The following will be considered in the establishment of UASF, among others:

- a. Source and the relative percentage to be imposed;
- b. Target beneficiaries;
- c. Expenditure mechanism;
- d. Overall fund structure and operation;
- e. Governance; and
- f. Fund performance monitoring.

### **2.2.2 Facilitate Infostructure Sharing**

In order to reduce the associated costs in the broadband rollout, the government shall provide guidelines in infostructure sharing. Guidelines will cover, among others, the following: (a) systems interconnection and integration models and standards; (b) interconnection fee structure; (c) dispute resolution; (d) repository of available infostructure; and (e) infostructure sharing regime. Moreover, government also considers the construction of ready-made conduits, poles, as well as laying down dark fiber, and the like through public-private partnerships (PPPs) or other investment models to fill the gaps on the existing infostructure.

### 2.2.3 Leverage Existing Government Infrastructure Assets

One of the obstacles in broadband rollout is attributed to high civil work costs. By opening up the existing government-owned facilities to market players, these construction costs will be lowered. Details of this initiative shall include, but are not limited to:

- a) Making DICT (former TELOF) towers available for use by market players through PPP, MOA, or lease agreement.
- b) Considering National Grid Corporation of the Philippines (NGCP) fiber cores for possible use of government backbone.
- c) Maximizing the utilization of the established Government Network (GovNet) nationwide
- d) Forging with Department of Transportation (DOTr) to allow fiber rollout along the existing railroads and access roads to airports and seaports.

With these initiatives, the government will come up with an ICT convergence program to formalize and coordinate the usage of these assets. The Department will form an agreement or inter-agency issuance to specify the details of sharing, conditions that may be pursued, management of these facilities, risk sharing, among others.

### Institutionalize “Dig Once” Policy

The government will institute a “Dig Once” policy to minimize road disruptions and enhance cost-efficiencies. The policy will establish a regime that will require utility service providers and government agencies to synchronize the deployment of infostructures. This is possible by requiring coordination either with a telecommunications and ICT provider or utility service providers prior to securing excavation permits. As an alternative, the government may opt to consider other techniques such as microtrenching.

### 2.2.4 Use the Existing Infrastructure of Utility Companies

The government may consider using the existing infrastructure facilities like roads, electricity poles, and others to further minimize costs associated with civil works. This can be realized by entering in to memoranda of understanding or agreement with the infrastructure owners, as appropriate and feasible.

## 2.3 OUTCOME NO. 3: MORE PLACES CONNECTED

Recognizing the benefits of broadband, the government shall take necessary steps to ensure that primarily all public schools, health institutions, government sites, and public places will be connected to the internet. In the furtherance of this initiative, the government will also ensure the efficient management of spectrum resources, and the adoption of satellite and emergent technologies to provide wider access to broadband.

### 2.3.1 Optimize Spectrum Utilization

With increasing reliance on mobile broadband, the need for greater efficiency in spectrum allocations and assignments becomes a primordial concern. To ensure that the existing spectrum can deliver and support current and future applications, the government shall consider the following strategies:

- **Repurposing or Recall of Assigned but Unutilized and Underutilized Spectrum**

For the government to effectively manage and monitor the spectrum, it will audit such scarce resources by implementing a spectrum monitoring system. The government will identify unutilized and underutilized frequencies, preventing the assignees from hoarding the said frequencies. After due process, the government can fully decide which frequencies can be recalled or re-farmed.

- **Encourage Co-use of Spectrum**

As provided in RA 7925, the frequency spectrum is a scarce public resource that shall be administered according to public interest. To serve this need, initiatives such as co-use of spectrum shall be encouraged and be supported through the following:

- liberalization of the existing market, by allowing new market players such as mobile virtual network operators;
- establishment of the necessary framework for spectrum sharing to safeguard the consumers and other service providers from uncompetitive practices, i.e. collusion; and
- provision of reference access offers (RAOs) for spectrum lease or trading.

The government can also establish a new spectrum licensing regime to allow innovative approaches such as the authorization of shared access to licensed spectrum, and the re-farming of 2G and 3G frequencies.

In order to have an effective and fair implementation of spectrum co-use, the role of the Philippine Competition Commission (PCC) in reviewing deals should be strengthened, to uphold public interest and ensure fair, transparent, and non-discriminatory access to spectrum.

- **Implement dynamic spectrum allocation**

The continuous growth of wireless networks will require additional spectrum. To future proof this, introduction of dynamic spectrum allocation is necessary. This spectrum allocation allows different devices to dynamically share a given spectrum, subject to availability of spectrum slots and transmit power levels. This can be done by leveraging technical solutions (e.g. filters, smart antennae, smart transmitters like software-defined radio and cognitive radio) and administrative rules (e.g. time, geographic, and interference-management constraints).

### **2.3.2 Leverage the Use of Satellite and Emerging Technologies**

Considering the archipelagic nature of the country, the use of wireless technologies, for instance satellite and TV White Space (TVWS) technologies, is seen as a feasible alternative in providing internet and broadband internet access in the countryside. Given the geographic layout of the country, it may take time for providers to lay submarine cables on almost all of its habitable islands.

The government can replicate the success of the adoption of the TVWS technology, and provide internet access on a wider range. The government can provide broadband services using TVWS technology, particularly in low or sparsely populated areas.

The government will provide the following policy interventions, among others, to ensure the smooth implementation and adoption of these wireless technologies:

- **Use Satellite Technologies in Geographically-isolated Areas**

Given the archipelagic setup of the country, the government considers the deployment of satellite receivers to cater broadband services in the countryside, where other terrestrial and submarine broadband technologies are not feasible.

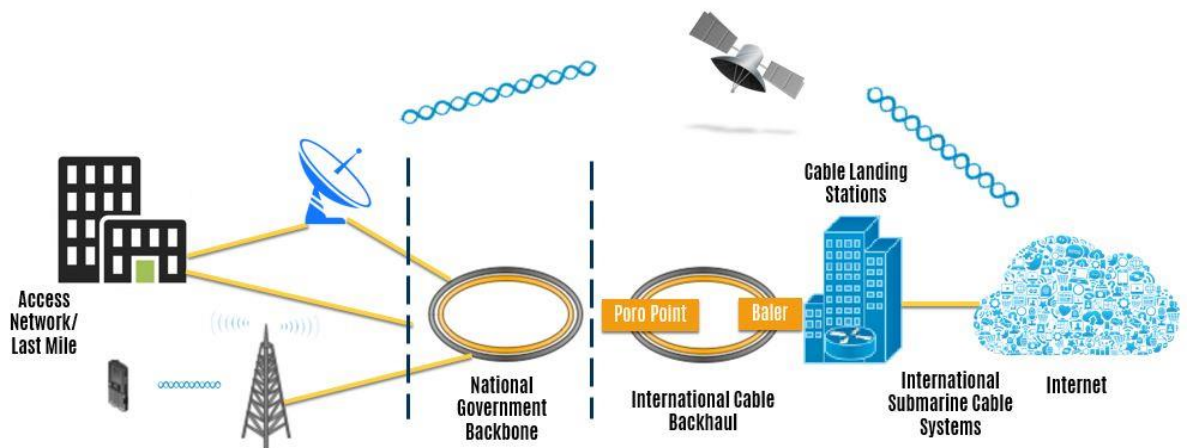
- **Accelerate Deployment of TVWS Technologies**

The NTC shall reserve the freed-up frequencies due to the digital migration or the “digital dividend” frequencies in favor for the public interest. Further, the government must also ensure that these frequencies will be accessible by both public and private entities, via PPP, subject to a non-interference policy as may be required by the regulator. By optimizing the usage of TVWS frequencies, the government will be capable of providing wider access to broadband, particularly in the countryside.

### 2.3.3 Establish the Philippine Integrated Infostructure (PhII)

As mandated by the law, the government, through the DICT, will ensure the availability and accessibility of ICT services in areas not adequately served by the private sector, and promote the use of ICT for the enhancement of key public services.

To serve these needs, the government will invest in broadband infrastructure by establishing the Philippine Integrated Infostructure (PhII). The PhII constitutes of international submarine cable landing stations, national government backbone, and the access network. PhII will address the bottlenecks particularly in backbone and backhaul segments and affordability issues, as well as augment the bandwidth needed for the growing requirements of today’s digital society. Last mile access of this infostructure will primarily cater to the provision of Free WiFi in public places.



**Figure 21.** PhII’s Network Architecture

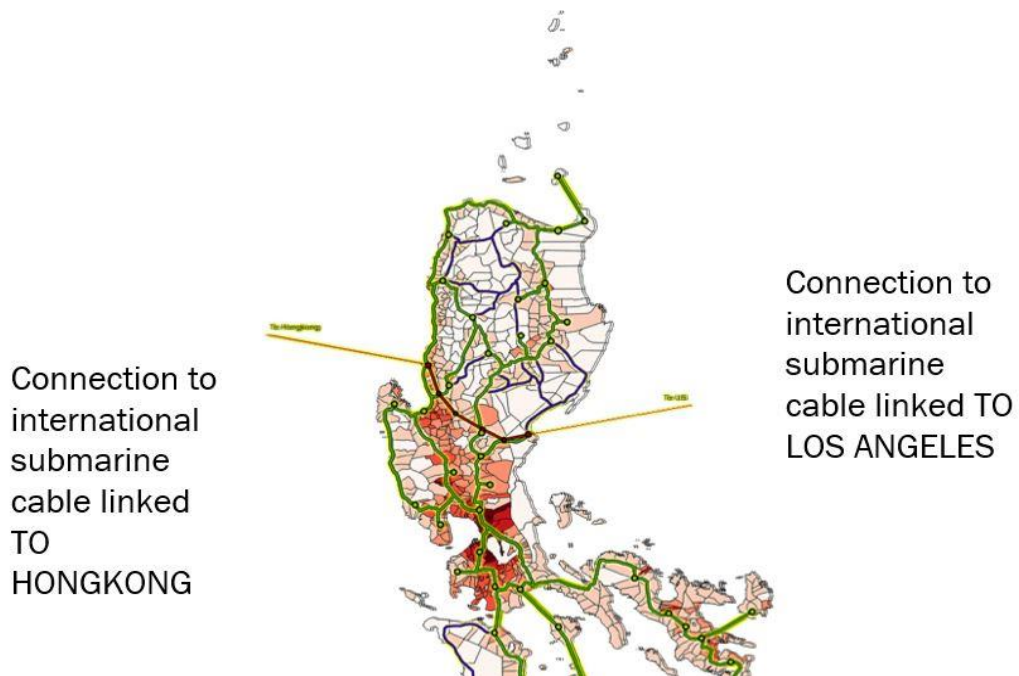
In view of these prevailing challenges, the government, through the PhII, will provide the following infostructure initiatives:

- **Diversify the Provision of International Connectivity**

**Submarine Cable Landing Stations**

The government through Bases Conversion and Development Authority (BCDA) will construct two IT Facilities located in San Fernando, La Union and Baler, Aurora, to provide diversity in the international connectivity. Aimed to be a world-class facility, the Modular Information Technology Facility (MITF) will serve as a landing station for international submarine cables terminating in the Philippines to support the PhII initiatives of the DICT and the broadband needs of the national government agencies.

These facilities will primarily provide bandwidth to drive government infostructure initiatives. International connectivity will be delivered to potential access seekers in an open, transparent and non-discriminatory manner, consistent with the proposed open access policy. Taking into account the investment needed for this infostructure, the government may enter into either PPP or consortium-type of arrangement.



**Figure 22.** Phil’s Proposed Submarine Cable System Connections

- **Provide Demand Responsive Domestic Connectivity**

**National Government Backbone**

The National Spatial Strategy in the Philippine Development Plan (PDP 2017-2022) and the results of the NTC’s Fixed & Wireless Broadband Data Survey shall define the areas to be served with the domestic backbone

routes. The National Spatial Strategy defined the areas that are considered growth centers (Table 7) situated in provinces, cities, and municipalities, which will eventually serve as the primary nodes of the backbone.

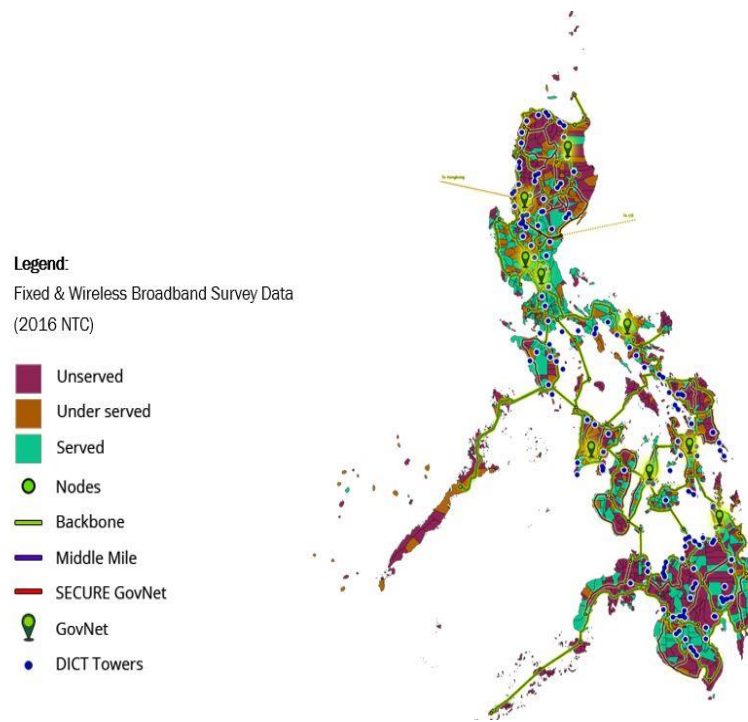


**Table 7. Growth Centers Identified in National Spatial Strategy of PDP 2017-2022**

<b>Growth Centers</b>	<b>Region/Province/City/Municipality</b>
1. Metropolitan Centers	<ul style="list-style-type: none"> <li>• NCR</li> <li>• Metro Cebu</li> <li>• Metro Davao</li> <li>• By 2025, Metro Cagayan De Oro (CDO City, Jasaan, Villanueva, Tagoloan, Claveria, Opol, El Salvador, Alubijid, Laguindingan, Gitagum, Libona, Manolo Fortich, Talakag, Baungon, Malitbog, Sumilao)</li> </ul>
2. Regional Centers	<p>Laoag City, Tuguegarao City, Tabuk City, Santiago City, San Fernando City, Baguio City - La Trinidad – Itogon – Sablan – Tuba – Tublay, Cabanatuan City, Tarlac City, Subic-Olongapo City, Balanga City, Clark (Angeles City, San Fernando City, Mabalacat, Porac and Bacolor), Baliuag, Malolos City, Dasmariñas City, Antipolo City, Calamba City, Batangas City, Lucena City, Calapan City, Puerto Princesa City, Legazpi City, Naga (Naga City, Bombon, Calabanga, Camaligan, Canaman, Gainza, Magarao, Milaor, Minalabac, Pamplona, Pasacao, Pili, San Fernando, Bula and Ocampo), Iloilo City – Pavia – Oton – Leganes, Santa Barbara – San Miguel, Bacolod (Bacolod City, Talisay City and Silay City), Tagbilaran City, Tacloban City, Ormoc City, Zamboanga City, General Santos City, Butuan City, Cotabato City, Dipolog City, Jolo, Surigao City, Pagadian City, Koronadal City, and Tagum City</p>
3. Subregional Centers	<p>Alfonso Lista (Potia), Banaue, Bangued, Bauko, Besao, Bontoc, Danglas, Flora, Kiangan, La Paz, Lamut, Langiden, Luna, Penarrubia, Pidigan, Pudtol, Sadanga, San Isidro, Santa Marcela, Tayum, Tubo, Alaminos City, Dagupan City, Cauayan City, Ilagan (Capital), Santa Ana, Arayat, Capas, Concepcion, Hagonoy, Lubao, Mabalacat, Marilao, Mariveles, Mexico, Meycauayan City, San Fernando City, San Ildefonso, San Jose City, San Jose del Monte City, San Miguel, Santa Maria, Bacoor, Baras, Biñan City, Cabuyao, Cainta, Gen. Mariano Alvarez, General Trias, Imus, Lipa City, Nasugbu, Rodriguez (Montalban), San Mateo, San Pablo City, San Pedro, Santa Rosa City, Sariaya, Silang, Tanauan City, Tanza, Taytay, Boac, Romblon, San Jose, Daet, Iriga City, Ligao, Masbate City, Matnog, Pili, Sorsogon City, Tabaco, Virac, Roxas City, Malay, San Carlos City, Kabankalan City, Estancia, Dumangas, San Jose, Miagao, Catbalogan City, Calbayog City, Panabo City, Marawi City, Ozamis City, Malaybalay City, Jordan, Kalibo, Dumaguete City, Bogo City, Toledo City, Tubigon, Valencia City, Digos City, Polomok, Midsayap, Mati City, Kidapawan City, Gingoog City, Bislig City, Tandag City, Tacurong Cotu, Bongao (Tawi-Tawi), Parang (Maguindanao), San Francisco, Tubod, Maramag, Ipil (Zamboanga Sibugay), Glan (Saranggani), Malita, Laguindingan, Isabela, Lamitan, Aurora, Siquijor, Mambajao (Camiguin), Cabarroguis (Quirino), Borongan (Eastern Samar)</p>

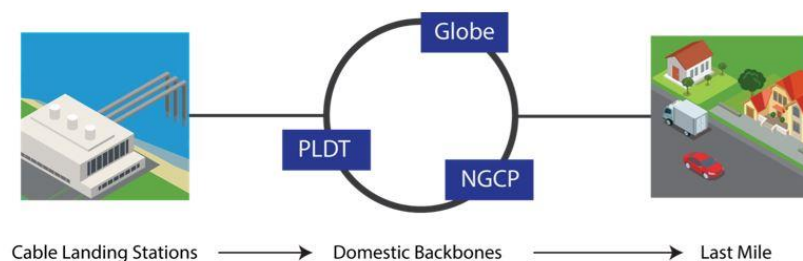
## PART TWO: REALIZING THE BROADBAND VISION

Further, the unserved, underserved and served areas (Figure 23) specified in the Fixed & Wireless Survey Data are also considered in the identification of backbone routes.



**Figure 23.** The Philippine Integrated Infostructure (PhII) Overview Map

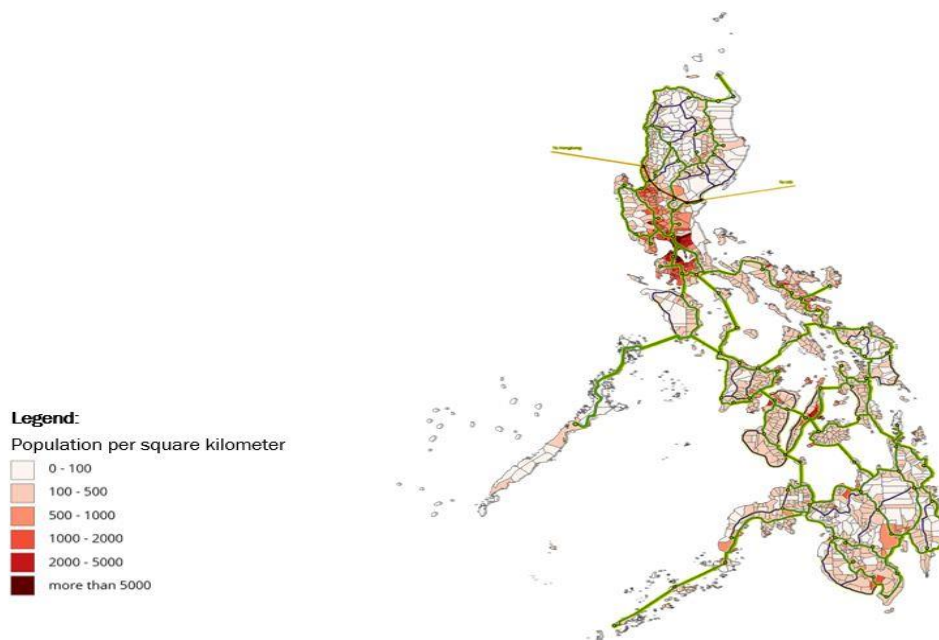
Other infostructures such as the backbone networks of PLDT, Globe Telecom and NGCP, as well as the existing systems and initiatives of the government like GovNet, iGovPhil, Free Wi-Fi in Public Places, Tech4ED, among others, will be taken in to consideration and be linked to avoid duplications and to lower the cost needed for the implementation of the PhII.



**Figure 24.** Consideration of Existing Private Infostructures in the Provision of Broadband Access

## PART TWO: REALIZING THE BROADBAND VISION

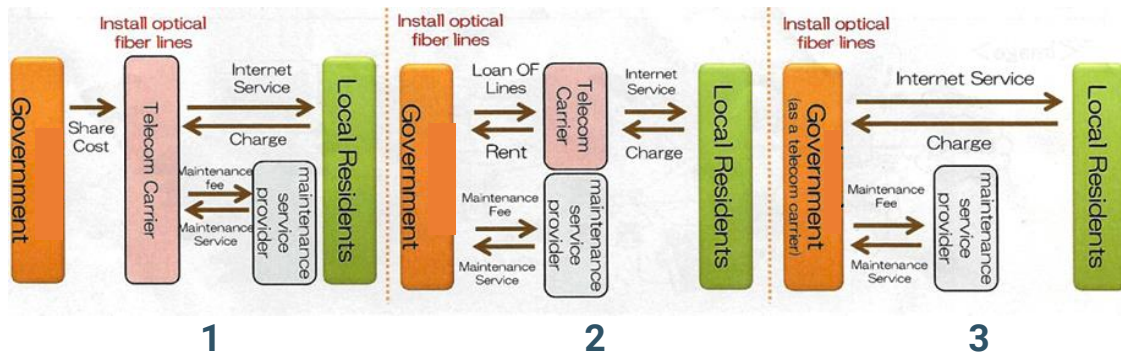
Priority will be given to areas (e.g. last mile), found not economically viable by existing players. A various mix of wired and wireless broadband technologies such as Fiber to the x (FTTx), Super WiFi, Long Term Evolution (LTE) – Advanced, TV White Space and Satellite are considered for the middle and last mile segments. The last mile covers countryside connectivity and access networks to government sites, public elementary and secondary schools, state colleges and universities (SUCs), public hospitals and rural health units (RHUs), disaster risk and reduction and management offices, peace and order units, among others.



**Figure 25.** PhII Network Plotted Against Population Density

To facilitate initiatives for the last mile, three option patterns are considered. In the first option pattern, the network and service provider will install lines and provide internet services to end users. Government may opt to share the cost in the deployment. For the second option pattern, the government will install the lines and the network and service provider will lease the utilization of the lines and provide internet services to end users. For the third option pattern, the government will install the lines and provide direct internet services to end users.

## PART TWO: REALIZING THE BROADBAND VISION



**Figure 26.** Option Patterns for the Last Mile

The PhII will be expected to provide at least 10 Mbps to cover households by 2020 at affordable cost. Furthermore, this infrastructure intervention will aid the government in developing new market opportunities and use cases, thus realizing the following:

- Inclusive and Pervasive Broadband Connectivity** – Broadband internet services are accessible to all segments of the society, anytime, anywhere.
- Unified Government** – Government services are delivered through an integrated and interoperable ICT network system
- Smart Countryside**– Rural areas are developed through the promotion of e-platforms, such as distance learning, telehealth, and telecommuting.

### 2.4 OUTCOME NO. 4: INCREASED TAKE-UP RATE

After developing necessary “push” measures to increase broadband supply, the government will also focus on the provision of “pull” measures in stimulating demand and increasing the take-up rate. This includes the provision of the following interventions and programs such as (1) promotion of the use and production of local contents and applications; (2) conduct of digital literacy programs; (3) introduction of fiscal incentives to broadband users; among others.

#### 2.4.1 Promote New Media, Local Content, and Application Development

For the sustenance of pervasive development of telecommunications and ICT infrastructure, the government will support the development of local content and applications by providing necessary initiatives such as incentives to local content developers from the inception, incubation and marketing of the contents and applications. Likewise, the government can also take into account

the provision of necessary policy and regulatory interventions to develop favorable environments for content and application.

Furthermore, the government will also consider the development of rich and useful contents and applications that will support the delivery of public services and creation of citizen engagement platforms. The same should be supported by the development of language Application Program Interfaces (APIs) and plug-ins to enable websites to offer content in English, Filipino, and major Philippine dialects. In this way, government can stimulate the utilization of telecommunications and ICT infostructure.

### **2.4.2 Conduct Capacity Building and Information Outreach Programs**

Equipping the citizens in using broadband services, contents, and applications becomes essential in moving towards a knowledge-based economy. By providing capacity building and information outreach programs, citizens will become aware of the benefits of broadband, from the provision of education, putting up online businesses, telecommuting, and research, development and innovation activities. Toward these ends, the government can also consider the establishment of regional telecommunications and ICT training institutes equipped with state-of-the-art facilities to enhance the development and adoption of the use cases of these technologies. Through such, the government can produce equipped local talents as well as valuable businesses and start-ups that can contribute towards inclusive development and digital transformation.

### **2.4.3 Encourage Communities of Practice (CoP) and Development of Rural Technology Roadmaps**

To further the development of the country's infostructure, Communities of Practice (CoP) will be established. These communities of practice, together with the government, will take part in the development of principles, norms, rules, decision-making procedures and programs that will shape the development and use of the infostructure. The same will also nurture a culture for substantial interaction, and interactions and discussions with a wide range of stakeholders including, but not limited to, government, industry players, and civil society organizations.

On the other hand, the government will also develop a rural technology roadmap, which will outline trends evolving in the ICT landscape. The roadmap will help public and private sector organizations in implementing these trends in the countryside, and in understanding the opportunities and challenges that may be encountered in the adoption of new and emerging technologies.

### 2.4.4 Introduce Incentives to Broadband Users

Relative to the broadband ecosystem, the government will develop “pull” measures to stimulate broadband demand. By adopting an access device scheme, the government can help the marginalized gain access to a device on a conditional basis. This condition will include utilization of the device in various applications such as, e-education, e-health, etc. Further, this initiative can be integrated to the existing programs and initiatives of government, particularly in the Department of Social Welfare and Development (DSWD)’s programs dealing with marginalized sectors, and the Department of Education (DepEd)’s online learning program.

### 2.4.5 Strengthen Broadband Performance Monitoring

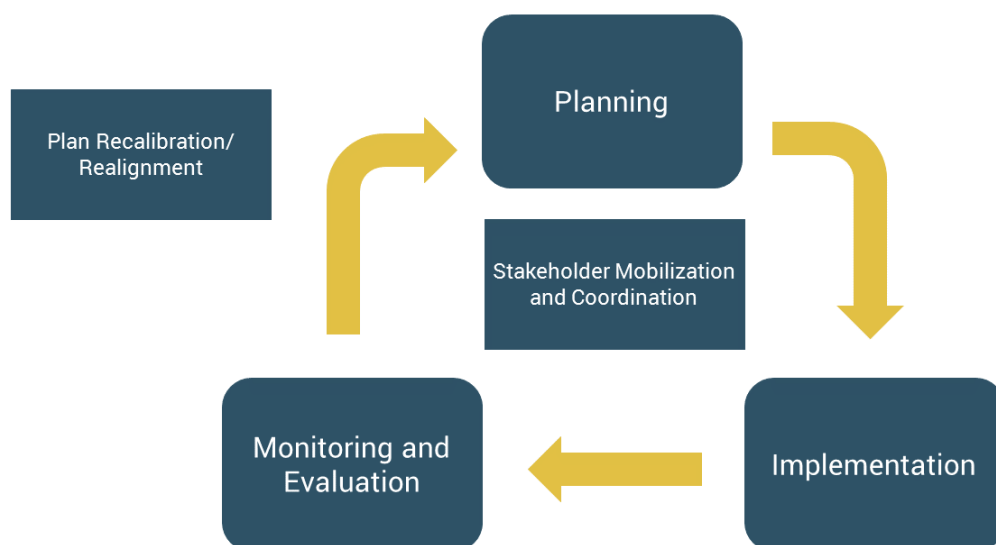
Responding to the clamor for faster and reliable broadband services, the government will set standard metrics and methodologies to monitor and measure the quality of service experience (QoSE) of key services offered by the operator. This will include the creation of a comprehensive QoSE framework to provide guidelines for standards, compliance, periodic performance submissions, and penalties that may be applied. To facilitate this framework, the government may opt to establish a Philippine Internet Measurement Facility (PhIMF). Using a defined methodology with appropriate benchmarks to be made publicly available, this facility will be deployed to the different network segments to measure various metrics (e.g. upload or download speed, round trip time, among others). To carry out the aspirations of PhIMF, the government will consider the following options: (i) hire local researchers; (ii) enjoin academic communities and technical organizations; (iii) enlist volunteers to carry out diagnostics; (iv) publicize QoSE diagnostic tool on regulators’ website; (v) host a diagnostic tool for public utilization while testing and publicizing QoSE results; (vi) collaborate with engineering colleges nationwide to conduct the QoSE monitoring.

Another alternative that may be considered by the government is the development of a free and open-source speed measuring software, crowdsourcing performance data samples throughout the country. A government application or plug-in can be built to facilitate the measurement, with crowdsourced performance data, or used through existing platforms developed by disinterested parties, such as academic institutions or research organizations, either local or international.

## PART THREE:

# TRACKING PROGRESS

Given its dynamic nature, the NBP will be supported by appropriate targets and indicators to gauge its success and aid future evidence-based policy making and development planning activities. The targets laid in this plan will take into account the whole broadband ecosystem, particularly the supply-side and demand-side of such. The targets will adopt the existing standard metrics set by International Communication Union, World Economic Forum, among others.



**Figure 27.** NBP Monitoring Framework

In line with the plan's timeline, targets laid on this plan will undergo an annual review. Undergoing this initiative will aid the recalibration of the plan's targets, making it more relevant and responsive to the evolving needs of the ecosystem. Stakeholders will be also mobilized and coordinated with in these activities (See Figure 27), thereby open and participatory monitoring is observed.

Furthermore, the NBP will be measured in accordance to the indicators set by national government agencies and international organizations and bodies. These indicators shall be harmonized with each other to simplify the benchmarking exercises.

Table 8. Performance Targets and Indicators

Outcomes	Indicators	Baseline			Year	Value
		Immediate (2017-2020)	Medium Term (2021-2024)	Long Term (2024-2027)		
Accelerated Investment	Increase in Networked Readiness Index	>4.3	>4.7	>4.9	2016	4.0
	Increase in Distance to Frontier Score: Dealing with Construction Permits	>73	>75	>76	2016	69.45
	Average private investment on broadband infrastructure, expressed in percentage of gross revenue	1%	1.5%	2%	2016	*
	Government investment in broadband infrastructure, expressed in percentage of the annual budget	2%	2.5%	3%	2016	*
Mobilized and Engaged Public and Private Sectors	Service Providers' Annual Reports and SEC Submissions; NTC					
	Annual Reports of NEDA, DBM, DICT					
Means of Verification	World Economic Forum The Global Information Technology Report					
	World Bank Group Flagship Report: Doing Business					



<b>More Places Connected</b>	Proportion of government agencies connected to broadband internet	2016	*	40%	60%	80%	Annual Reports of DICT, NTC
	Proportion of local government units connected to broadband internet	2016	*	40%	60%	80%	Annual Reports of DILG, DICT, NTC
	Proportion of public schools connected to broadband internet	2012	21.17%	>40%	>60%	>80%	Annual Reports of DepEd, DICT, NTC
	Proportion of state universities and colleges connected to broadband internet	2016	*	30%	60%	90%	Annual Reports of CHED, DICT, NTC
	Proportion of public hospitals and rural health units connected to broadband internet	2016	*	30%	60%	90%	Annual Reports of DOH, DICT, NTC

							Increased Take-up rate
No. of installed and activated cell sites	2016	(22000)	50000	60000	70000		
Service Providers' Annual Reports and SEC Submissions; NTC							
No. of operating submarine cables	2016	7	9	11	-		
Service Providers' Annual Reports and SEC Submissions; NTC							
Government fiber laid out (in kms.)	2016	*	*	*	*		
DICT							
No. of sites and areas connected to Free Wi-Fi Project	2016	247	-	-	-		
NTC, DICT							
ICT Development Index	2016	4.28	>4.34	>4.42	>4.46		
ITU Measuring Information Society							
e-Government Development Index (eGDI)	2016	0.5765	>0.60	>0.62	>0.63		
UN DESA e-Government Survey							
e-Participation Index	2016	0.5932	>0.63	>0.67	>0.69		
UN DESA e-Participation Index							
Cost of ICT Service, as % of GNI per capita	2016	7.53%	<6.4	<5.4	<5		
ITU Measuring Information Society							

Fixed Broadband Subscriptions per 100 Inhabitants	2016	3.40	>15	>30	>45	Broadband Commission The State of Broadband
Mobile Broadband Subscriptions per 100 Inhabitants	2016	41.58	55	75	85	Broadband Commission The State of Broadband
Percentage of Households with Internet	2016	28.30%	50%	70%	90%	Broadband Commission The State of Broadband
Percentage of Individuals with Internet	2016	40.70%	>55%	>70%	>85%	Broadband Commission The State of Broadband
Average Broadband Speed (in Mbps)	2016	4.2	10	20	50	Akamai State of the Internet



# PART FOUR:

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# IMPLEMENTATION PLAN

The overarching vision, outcomes and targets set by this plan require the participation of each stakeholder for its realization. Thus, it is vital to secure the commitment of these stakeholders to effectively implement the action items of each strategy, and monitor the progress set. As the prime agency that governs ICT initiatives, the Department will spearhead the implementation of this plan.

## **4.1 APPROVAL OF AN ISSUANCE FOR THE ADOPTION AND IMPLEMENTATION OF NBP**

In order to fast track the implementation of the Plan, the appropriate issuance will be released to provide policies and guidelines towards plan adoption. This will ensure a coordinated and concerted approach in implementing procedures, requirements, and policies related to access to government and non-government property, to advance the deployment of both wired and wireless broadband infrastructure.

## **4.2 INSTITUTIONALIZE GOVERNANCE STRUCTURE FOR NBP IMPLEMENTATION**

A governance structure will be set in place to provide oversight for the NBP implementation and ensure the security thereof. It will establish policies, procedures, values, and planning to meet the mission of the NBP. It will be accountable for the development of the NBP project, its operation, and maintenance.

## **4.3 DEVELOP AND FORMULATE OVERALL WORK AND FINANCIAL PLAN**

### **4.3.1 Conduct of Feasibility Studies (FS)**

The NBP's viability will be tested through a feasibility study comprising of technical, economic, market, and financial analyses. The conduct of FS will determine, among others, the demand and intervention areas where the government will deploy the broadband.

## PART FOUR: IMPLEMENTATION PLAN

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It will also determine the technology suitable for the location, taking into consideration the terrain landscape. Furthermore, the FS will provide a comprehensive review of the project, covering the following, among others, 1) benchmarking of high-level cost estimate, (2) progress on option variants analyses for infrastructure initiatives and preferred elements, (3) quantification of benefits and updated risks for scope options, (4) briefings with government and private sector to map and agree on targets, and (5) selecting policy initiatives and progress on execution.

The project is technology neutral and will be designed to meet the requirements of major island groups, regional or network design. In this way, it can be implemented simultaneously throughout the archipelago to fast track implementation.

During the preparation of the detailed network plans, a technical working group (TWG) consisting of industry and government experts will be formed to ensure proper coordination and non-duplication of the existing efforts of the private sector about the delivery of broadband services to unserved and underserved areas.

### **4.3.2 Preparation of Project Implementation Plan and Call for Proposals and Public Bidding**

Based on the results of Feasibility Study, the Detailed Project Implementation Plan will be prepared. The project will be subjected to procurement through a competitive bidding process. The basic tenet is that there must be competitive bidding regardless of the source of funds, whether local or foreign, by all branches and instrumentalities of government, its departments, offices, and agencies, including government-owned and/or-controlled corporations (GOCCs) and local government units (LGUs). Following Government Procurement Reform, a call for proposals and public bidding will be held in the initial stage of the procurement process.

#### 4.4 INDICATIVE TIMELINE OF ACTIVITIES PER OUTCOME

**Table 9.** Indicative Timeline of Activities per Outcome

<b>Timeline (Year)</b>	<b>Immediate Term 2017-2020</b>	<b>Medium Term 2021-2024</b>	<b>Long Term 2024-2027</b>
<b>Outcome #1: Accelerated Investment</b>	<ul style="list-style-type: none"> <li>- Amendment of Laws, Policies and Regulatory Frameworks related to broadband</li> <li>- Policy on Open Access, and Local IP Peering</li> <li>- Issuance of Executive Order for Permitting Fees, Permits and Processes Harmonization and NBP Adoption</li> <li>- Adoption of Philippine Electrical and Electronics Code</li> </ul>	<ul style="list-style-type: none"> <li>- Enactment of the “ICT Development Act”</li> <li>- Issuance of a Law regarding the Protection of Critical Infostructure Assets</li> </ul>	
<b>Outcome #2: Mobilized and Engaged Public and Private Sectors</b>	<ul style="list-style-type: none"> <li>- Facilitation of ICT Convergence Programs with the Agencies Concerned</li> <li>- Development of Dig-Once Policy</li> </ul>	<ul style="list-style-type: none"> <li>- Creation of Universal Access Fund and</li> <li>- Infostructure Sharing Framework and Regimes</li> </ul>	

<b>Outcome #3: More Places Connected</b>	<ul style="list-style-type: none"> <li>- Repurposing or recall of assigned but unutilized and underutilized spectrum</li> <li>- Creation of Spectrum co-used Framework</li> <li>- Deployment of the Philippine Integrated Infrastructure (PhII)</li> </ul>	<b>Outcome #4: Increased Take-up Rate</b>	<ul style="list-style-type: none"> <li>- Conduct of capacity building and information outreach programs</li> <li>- Encouragement of Communities of Practice (CoP) and Development of Rural Technology Roadmap</li> <li>- Introduction of incentives to broadband users</li> </ul>	<ul style="list-style-type: none"> <li>- Promotion of new media, local content, and applications development</li> <li>- Continuation of the following programs:               <ul style="list-style-type: none"> <li>1. Conduct of capacity building and information outreach programs.</li> <li>2. Encouragement of Communities of Practice (CoP) and Development of Rural Technology Roadmap</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>- Continuation of the promotion of new media, local content, and applications development program</li> </ul>
<b>Outcome #3: Repurposing or recall of assigned but unutilized and underutilized spectrum</b>	<ul style="list-style-type: none"> <li>- Continuing development of PhII Advancement of PhII</li> </ul>	<ul style="list-style-type: none"> <li>- Advancement of PhII</li> </ul>			



### 4.5 REVIEWING PROGRESS

Monitoring NBP can generally be broken down into two parts: Reviewing and Tracking its progress. Reviewing its progress every one to two years allows for adjustments to be made to the initiatives, policies and activities, so the achievement of the plan's targets can be matched with the level of current success, as well as take into account new market or sector developments. Tracking will record the actual and estimates of progress, and will be open, honest and FOI-compliant.



## **PART FIVE:**

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# **COMMUNICATION AND STAKEHOLDERS' ENGAGEMENT PLAN**

### **5.1 STAKEHOLDERS' ROLES AND CONTRIBUTIONS**

#### **5.2.1 Government**

Broadband has become essential to being a competitive nation, with the government capable of influencing markets either on the demand or supply-side. It has authority in the construction of policies that will lead the country to its economic development. The national and local governments also ensure that their citizens have access to the necessary infrastructure to be able to use the internet. The following roles of the government are defined as well for broadband development in the country:

- Harmonize broadband environment and policies on international, national, and local levels
- Conduct interventions in infrastructure roll-out, demand stimulation and capacity building
- Encourage local and foreign investors in PPPs to capitalize deployment of broadband infrastructures in hard to reach geographies across the country
- Lessen the barriers experienced by broadband players (e.g. regulatory barriers), especially for new entrants, to promote and maintain a competitive market

### 5.1.2 Broadband Network and Service Providers

Broadband operators in the private sector have an essential role in the roll-out of network infrastructure, delivery of broadband services, and growth of internet usage. Without their investment, broadband infrastructure would not be as available in the country as it is now, and the economy would not be as resilient. The following roles are expected from broadband operators

- Participate in PPP to support broadband projects
- Improve existing broadband infrastructure and services (e.g. security and performance), and improve internet access through broadband in unserved and underserved locations
- Offer affordable broadband services to increase the number of consumers and provide reliable connectivity for better consumer satisfaction
- Maintain a transparent disclosure regarding its broadband performance for the consumers to be able to compare broadband options

### 5.1.3 Civil Society Organizations and User Groups

Civil society organizations are important in the demand and larger push of internet connectivity. Successful broadband projects need engagement from all members of the community to maximize the social benefits of the network. This includes involvement from the civil society and individual citizens in broadband-related issues, where they can serve as the watchdogs of broadband operators. In addition, their roles can be as follows:

- Engage the CSOs to help solidify support for broadband projects.
- Educate the community on the benefits of high-quality internet access in their daily lives and how they can be a part of the broadband improvement that can drive the growth of the economy by holding capacity building and awareness activities.
- Engage the whole community by gathering inputs from all segments specially the less-advantaged citizens who are experiencing different barriers to fast, affordable, and reliable internet access through the conduct of surveys.

## **5.2 CONDUCT OF PROMOTIONAL ACTIVITIES AND AWARENESS CAMPAIGNS**

### **5.2.1 Develop a Website Specific for NBP Implementation**

A website specific for NBP implementation will be developed to provide information and updates related to PhII. The website will also make it easier for stakeholders to interact with the Department.

### **5.2.2 Facilitate National Stakeholders' Forum on the Need for Infostructure Development and Deployment**

The Department will create and facilitate a National Stakeholders' Forum on the Need for Infostructure Development and Deployment. The forum will be an opportunity to exchange perspectives, gather valuable insights, and strengthen important relationships for decision-making. The ultimate objective of facilitating a Stakeholders' Forum is to encourage an open and participatory approach to policy and planning development.

### **5.2.3 Create Feedback Platforms for Stakeholders**

A feedback platform for stakeholders will be initiated to further promote the development and use of broadband. It is designed to manage ideas, opinions, and arguments for or against an ongoing or future NBP deployment. Stakeholders may directly provide feedback through a "request-email" platform found on the NBP website.

### **5.2.4 Introduce Broadband Service Labeling**

The Department introduces Broadband Service Labeling, which provides consumers of mobile and fixed broadband Internet access service with easy-to-understand information about performance and price, to protect the rights and welfare of consumers and business users in matters relating to ICT. It includes more information on service speed and reliability and greater clarity regarding the costs of broadband service, including fees and other add-on charges that may appear on their bills.

### **5.2.5 Conduct Capacity Building Programs**

Aims to ensure readiness of stakeholders, particularly NGAs, to make them aware of the NBP and PHII, and cascade the different programs to the countryside to drive awareness.



# GLOSSARY

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For the purposes of understanding and implementation of the National Broadband Plan, the following terms are defined:

<b>Application Programming Interface (API)</b>	a set of commands, functions, protocols, and objects that programmers can use to create software or interact with an external system. It provides developers with standard commands for performing common operations so they do not have to write the code from scratch.
<b>backbone</b>	consists of very large capacity trunks (usually fiber optics) that connect to multiple fiber-optic lines capable of transmitting large amounts of data. It provides a path for the exchange of information that local or regional networks can connect with for long distance data transmission.
<b>backhaul</b>	portion of the network comprises the intermediate links between the core network, or backbone network and the small subnetworks at the "edge" of the entire hierarchical network.
<b>bit per second</b>	unit of measurement that normally used in measuring the data rate of a network connection.
<b>broadband</b>	defined as high-speed Internet access which is always-on and capable of multiple service provision simultaneously.
<b>broadband penetration</b>	is a term generally used to describe the number of active broadband users
<b>cell site</b>	is a cellular telephone site where antennae and electronic communications equipment are placed - typically on a radio mast, tower, or other raised structure - to create a cell (or adjacent cells) in a cellular network.
<b>critical infostructure</b>	refers to the computer systems, and/or networks. Whether physical or virtual, and/or the computer programs, computer data and/or traffic data so vital to this country that the incapacity or destruction of or interference with such system and assets would have a debilitating impact on security, national or economic security, national public health and safety, or any combination of those matters.
<b>cognitive radio</b>	a radio system employing technology that allows the system to obtain knowledge of its operational and geographical environment, established policies and its internal state; to dynamically and autonomously adjust its operational parameters and protocols according to its obtained knowledge in order to achieve predefined objectives; and to learn from the results obtained.
<b>communities of practice</b>	groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly.

<b>Department</b>	refers to the Department of Information and Communications Technology
<b>E-Government Development Index (eGDI)</b>	this index offers a snapshot of trends in the development of e-government in countries across the globe. It incorporates the access characteristics, such as the infrastructure and educational levels, to reflect how a country is using information technologies to promote access and inclusion of its people. The eGDI is a composite measure of three important dimensions of e-government, namely: provision of online services, telecommunication connectivity and human capacity.
<b>E-Participation Index</b>	is derived as a supplementary index to the UN E-Government Survey. It extends the dimension of the Survey by focusing on the use of online services to facilitate provision of information by governments to citizens [“e-information sharing”], interaction with stakeholders [“e-consultation”], and engagement in decision-making processes [“e-decision making”].
<b>essential facilities</b>	a facility or infrastructure which is necessary for reaching customers and/or enabling competitors to carry on their business.
<b>fiber optic cable</b>	A telecommunications cable in which one or more optical fibers are used as the propagation medium.
<b>franchise</b>	A special privilege to do certain things that is conferred by government on an individual or a corporation and which does not belong to citizens generally of common right.
<b>Global Information Technology Report</b>	features the latest iteration of the Networked Readiness Index, which assesses the factors, policies and institutions that enable a country to fully leverage information and communication technologies (ICTs) for increased competitiveness and well-being.
<b>Government Gross National Income per capita</b>	refers to the Republic of the Philippines’ government is the country’s final income in a year, divided by its population. It reflects the average income of a country’s citizens.
<b>Human Development Index (HDI)</b>	is a summary measure of average achievement in key dimensions of human development: a long and healthy life, being knowledgeable and have a decent standard of living.
<b>ICT Development Index (IDI)</b>	is a standard tool that governments, operators, development agencies, researchers and others can use to measure the digital divide and compare ICT performance within and across countries. IDI is based on 11 ICT indicators, grouped in three clusters: access, use and skills.
<b>information and communication technology (ICT)</b>	It is the totality of electronic means to access, create, collect, store, process, receive, transmit, present and disseminate information.
<b>infostructure</b>	also known as information infrastructure, this ICT system comprises of hardware, networks, applications, etc., that is being used by society, business, or other group to collect and distribute information



<b>international gateway facility (IGF)</b>	a facility consisting of international transmission, switching and network management facilities which serve as point of entry and exit in the Philippines of international traffic between the national network and point/s outside the Philippines
<b>lit capacity</b>	the actual traffic-carrying capability of the system today, based on what has been equipped to date
<b>last mile</b>	the portion of the access network between the customer premises equipment and the access node
<b>multistakeholder model</b>	a governance model that seeks to bring stakeholders together to participate in the dialogue, decision making, and implementation of solutions to common problems or goals.
<b>power line communication (PLC)</b>	a communication technology that enables sending data over existing power cables
<b>PPP</b>	or “public-private partnerships” is a term describing when private sector entities perform business activities, but that a sharing of resources, risks and benefits between the parties is involved.
<b>Quality of Service (QoS)</b>	describes technical performance parameters that reflect the quality of an Internet connection
<b>refarming</b>	the abolition of existing band allocations in the radio spectrum and the more efficient reallocation of the spectrum into smaller bands
<b>reference access offer (RAO)</b>	refers to a default offer or agreement containing the terms and conditions, including prices, on which a public telecommunications entity is prepared to provide access and other related services to any access seeker
<b>software defined radio</b>	a radio transmitter and/or receiver employing a technology that allows the RF operating parameters including, but not limited to, frequency range, modulation type, or output power to be set or altered by software, excluding changes to operating parameters which occur during the normal pre-installed and predetermined operation of a radio according to a system specification or standard.
<b>spectrum</b>	refers to the entire range of electromagnetic frequencies used for communications which includes frequencies for radio, radar, wireless telecommunications, and television uses.
<b>sunset provision</b>	a statutory provision providing that a particular agency, benefit, or law will expire on a particular date, unless it is reauthorized by the legislature.
<b>universal service fund</b>	a financial mechanism which helps compensate telecommunications service providers or other communications entities to cater telecommunications/internet service in rural areas at affordable price.



**DEPARTMENT OF INFORMATION AND  
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