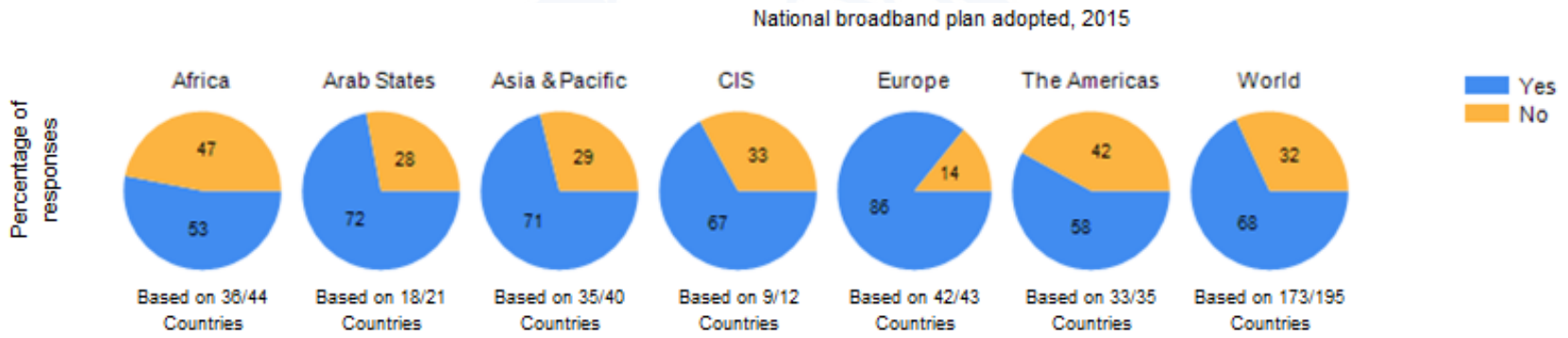
Wireless Broadband Policy: Case Studies

06 – 0 9 August 2016,
Tehran, Islamic Republic of Iran

Sameer Sharma, Senior Advisor
ITU Regional Office for Asia and the Pacific

National Broadband Plans



Source: ITU Telecommunication/ICT Regulatory Database

ITU

National Broadband Plans

Indicator		Number of countries/economies						
		Africa	Arab States	Asia & Pacific	CIS	Europe	The Americas	Total
Goals of the broadband plan *	Build nationwide broadband infrastructure	13	8	17	4	28	10	80
	Connect per cent of households with broadband	5	7	10	4	24	6	56
	Promote the adoption of broadband services and applications	13	4	19	3	19	9	67
	Promote the provision of public services using broadband	14	7	17	4	21	10	73
	Promote the provision of broadband services to specific populations	5	2	8	1	6	3	25
	Others	1	1	5	0	10	8	25
Means of financing the broadband plan *	Dedicated broadband development fund	2	1	2	1	7	3	16
	Universal service fund	5	3	7	0	0	4	19
	Government grants of other direct financial subsidies	5	1	9	1	15	6	37
	Public-private partnerships (PPPs)	7	3	10	1	13	9	43
	Other, please specify	3	0	5	1	21	6	36

* This indicator allows multiple choice per country/economy

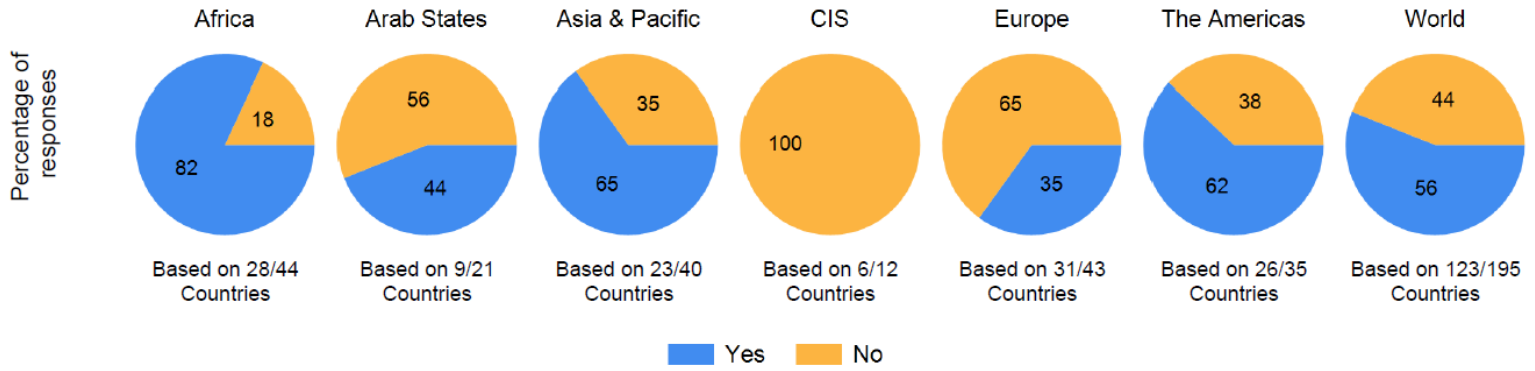
Year: 2015 or latest available data.

Source: ITU World Telecommunication/ICT Regulatory Database

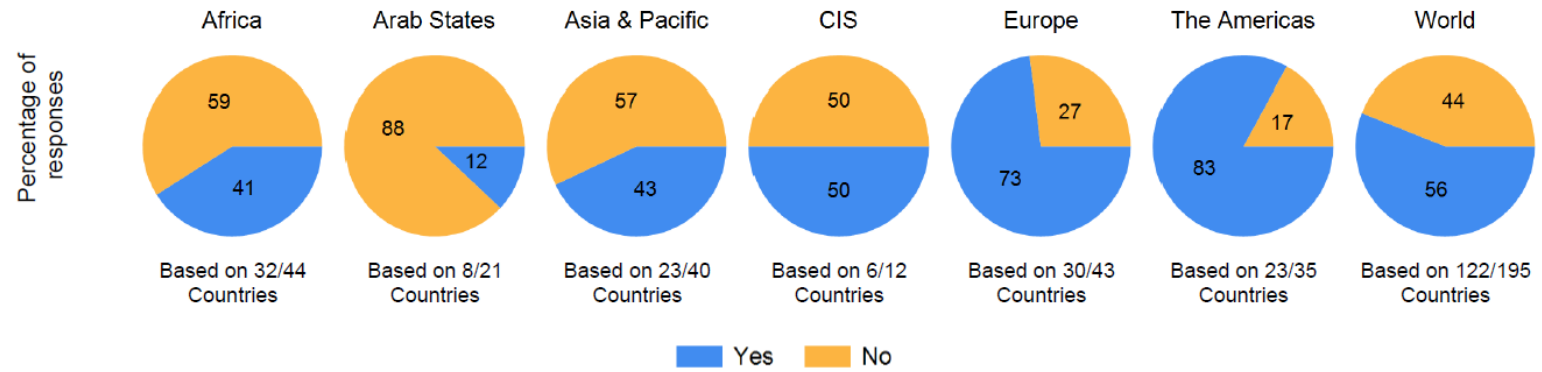
ITU ICT-Eye: http://www.itu.int/icteye

Broadband Service and Universal Access: Regulatory Trends

Broadband service as part of the universal service/access scheme, 2015



May service providers differentiate broadband access and services on the basis of geographic area?, 2015



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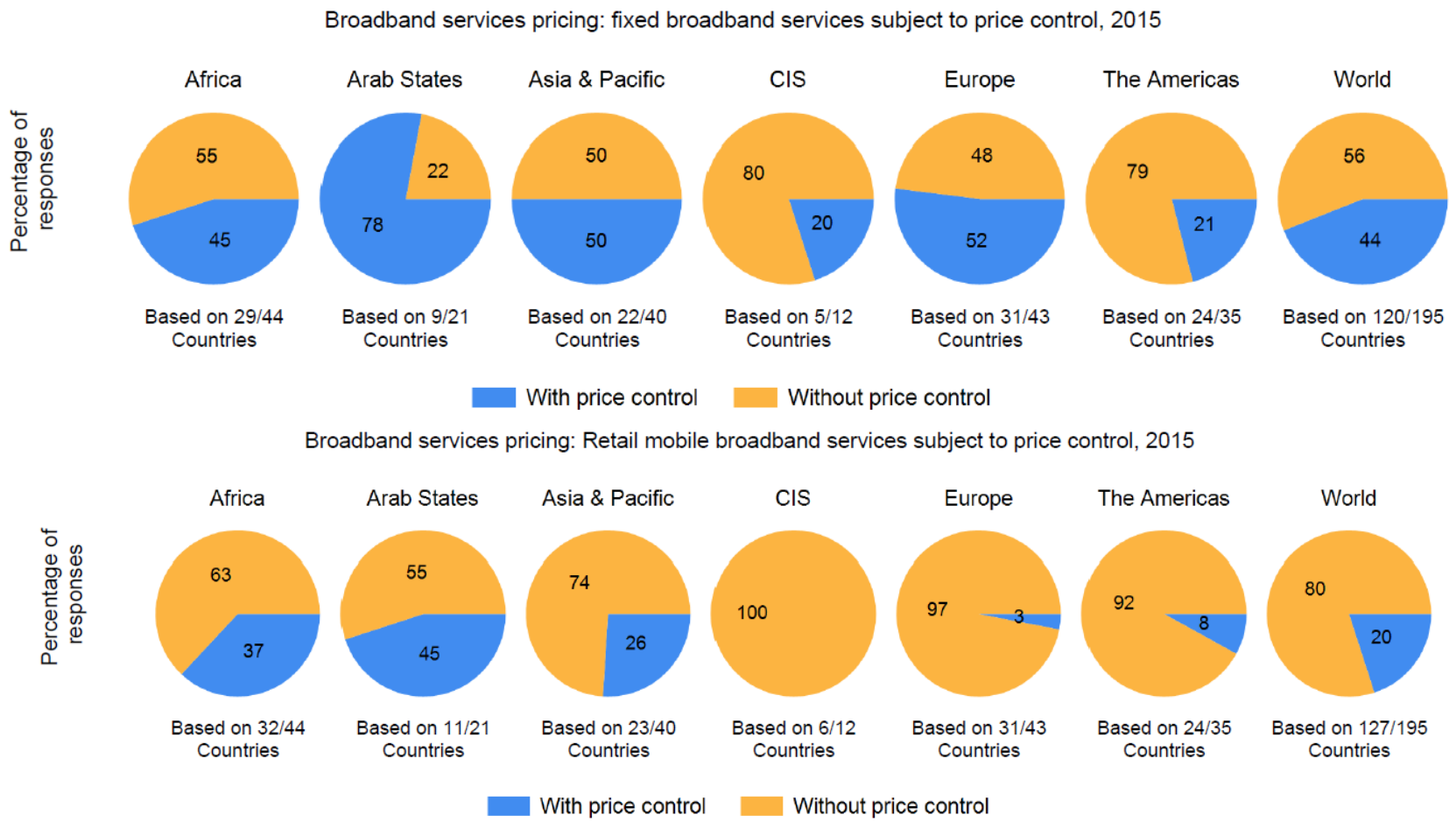
Broadband Service Pricing : Regulatory Trends



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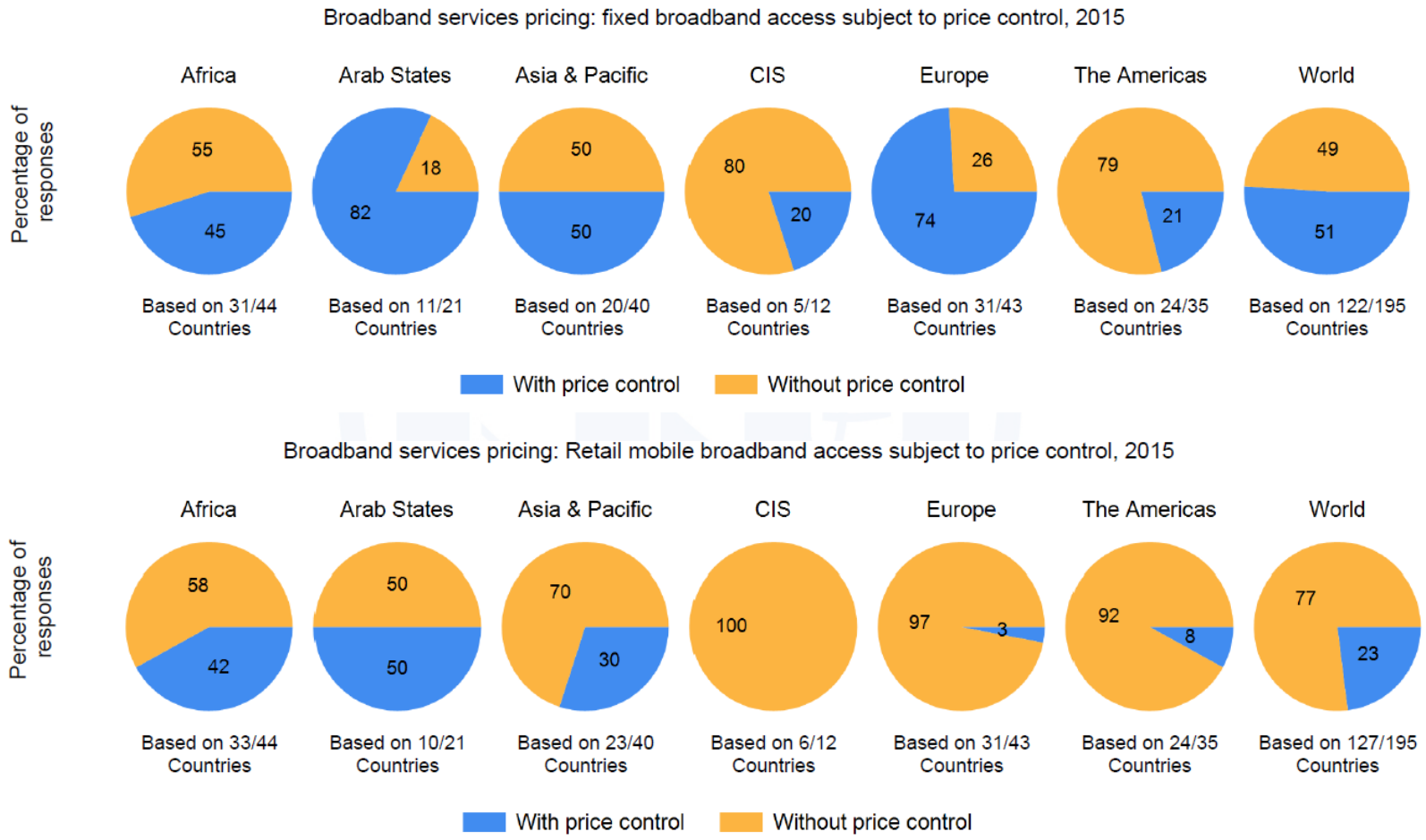
Broadband Access Price Control : Regulatory Trends



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Licensing

Answer	Africa	Arab States	Asia & Pacific	CIS	Europe	The Americas	Total
Service-specific individual licences/concessions ; (i.e., each type of network or service requires a separate licence; not including licences for radio frequency spectrum and numbers)	16	11	16	5	11	19	**78**
Multi-service individual licenses (i.e., several types of services are authorized under an individual or class licence and there may be a distinction between infrastructure/facilities-based and non-facilities based services)	11	4	11	3	4	9	**42**
Unified/global licenses (i.e., all electronic communications networks and services are permitted under a single authorization or licence, regardless of whether they are facilities-based or non-facilities based services)	4	3	6	0	2	3	**18**
General authorizations (Class licenses) (i.e., all electronic communications networks and services are permitted under a single authorization or licence, regardless of whether they are facilities-based or non-facilities based services)	8	5	10	1	20	9	**53**
Simple notification	0	2	2	3	19	5	**31**
License exempt	6	2	5	3	13	5	**34**
Other	1	0	5	0	1	2	**9**

Infrastructure Sharing

Number of countries/economies

Indicator		Africa	Arab States	Asia & Pacific	CIS	Europe	The Americas	Total
Is infrastructure sharing mandated (towers, base stations, posts, ducts, etc.)?	Yes	27	13	14	4	28	21	**107**
	No	11	1	18	3	13	12	**58**
Is infrastructure sharing for mobile operators permitted (e.g. Mobile Virtual Network Operators)?	Yes	32	13	25	7	39	24	**140**
	No	6	4	7	1	3	4	**25**
Is there a regulatory obligation to share sites? *	Regulatory obligation	19	9	7	0	15	12	**62**
	Agreement between operators	25	8	20	5	23	20	**101**
	None	1	1	1	2	5	2	**12**
Does the infrastructure sharing result in lower prices for end-users?	Yes	18	8	13	2	14	8	**63**
	No	12	3	7	4	8	9	**43**
Is co-location/site sharing mandated?	Yes	22	10	16	2	27	21	**98**
	No	13	2	14	5	10	11	**55**
Region size		**44**	**21**	**40**	**12**	**43**	**35**	**195**

* This question allows multiple answers per country/economy

Year: 2015 or latest available data.

Source: ITU World Tariff Policies Database

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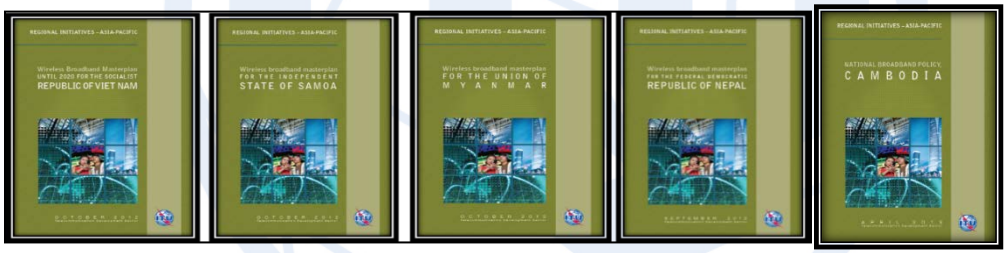
Source: ITU World Tariff Policies Database

ITU: Asia-Pacific Regional Initiatives (2015-2018)

Initiative #1	Special Consideration For LDCs*, SIDSs**, Including Pacific Island Countries, And Landlocked Developing Countries
Initiative #2	Emergency Telecommunications
Initiative #3	Harnessing The Benefits of New Technologies
Initiative #4	Development of Broadband Access and Adoption of Broadband
Initiative #5	Policy And Regulation

ITU Asia-Pacific Broadband Initiatives

- As of 2014, **11 countries out of the 38 ITU member states** in the Asia-Pacific region did not have a broadband policy / plan / initiatives while some countries need to improve/update their policy (***Broadband*** Commission, 2014)
- **Under the ASP RI 4,** ITU (in collaboration with the Republic of Korea) assisted **16 member states** establishing :
  - ✓ **Wireless Broadband Master Plans** (Myanmar, Nepal, Samoa, Vietnam)
  - ✓ **National Broadband Policy/Plans** (12 LDCs or developing countries)



Broadband Policies for Vietnam, Samoa, Nepal, Myanmar, Bhutan, Bangladesh, Cambodia , Nepal, PNG, Indonesia, Pakistan, Lao PDR, Vanuatu, Marshall Islands, Brunei, Philippines

The common objective between all the pilot WBB Masterplans.

To provide access to WBB services and applications which are affordable and comparable to those in developed countries. In essence to address the 'digital divide' by utilising those technologies.

Introduction to the WBB Masterplan Case Studies

Under the joint partnership of ITU and KCC, the Wireless Broadband Master Plan project was launched in Q2 2011.

The objective of the project is to assist selected countries in the Asia-Pacific region develop their own wireless broadband master plan, which will eventually provide access to broadband supported services and applications at rates that are affordable and comparable to those in developed countries. In essence to address the 'digital divide' by utilising wireless broadband technologies.

ITU sought information from Government, regulators and other key stakeholders on the policies and strategies that are being implemented by ITU Asia-Pacific members to facilitate the deployment of wireless broadband ('WBB') in their countries.

Introduction to the WBB Masterplan Case Studies

The pilot countries selected were Myanmar, Nepal, Samoa and Viet Nam.

They represent a diverse set of countries in terms of size, demographics, location, and challenges (e.g. low penetration or converting from voice to data, etc.).

The 4 Masterplans have been prepared for the purposes of providing an analysis of each country's broadband capability and provide recommendations for the development of effective wireless broadband technology. They also consider key regulatory aspects for the provision of wireless broadband services throughout the country.

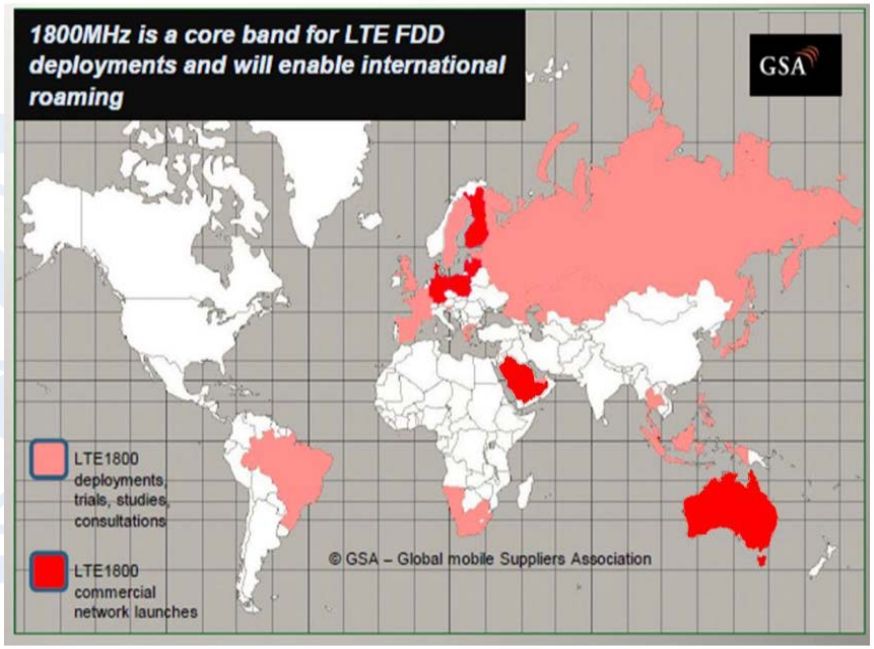
Note that the material presented in these slides is intended to provide an overview of the WBB Masterplan of each country. It details recommendations that have not been endorsed by the ITU nor indeed the Government of the pilot country. Certain recommendations are confidential to the Government/regulator and as a consequence are not detailed here today.

Pilot Country: Viet Nam

Key points from the WBB Masterplan include:

- Flexible rights of use should be instituted for key wireless spectrum allocations with technology neutral use including WCDMA @ 900 and LTE @ 1800 MHz

Countries with UMTS 900 deployments include: Australia, Bulgaria, Croatia, Estonia, Faroe Islands, Finland, France, Germany, Ghana, Greenland, Hong Kong, Iceland, Latvia, New Zealand, Poland, Qatar, Romania, Russia, Slovenia, South Africa, Spain, Switzerland, United Kingdom, Ukraine and Venezuela.



- There is a need to encourage better, more affordable WBB services by promoting service competition eg the VNTA should consider mandated access for MVNOs to promote more dynamic market and reduce entry barriers for potential new 4G competitors.

- Planning for and executing the Digital TV migration will free up digital dividend spectrum below 1 GHz that could enhance broadband coverage many times over. Plans for a two stage digital dividend are endorsed.

- Minimum spectrum allocation for cellular mobile services in Viet Nam should be at least 760 MHz in 2020 and preferably 840 MHz. Although demand for wireless services will be high, these targets are achieveable if the digital dividend is secured.

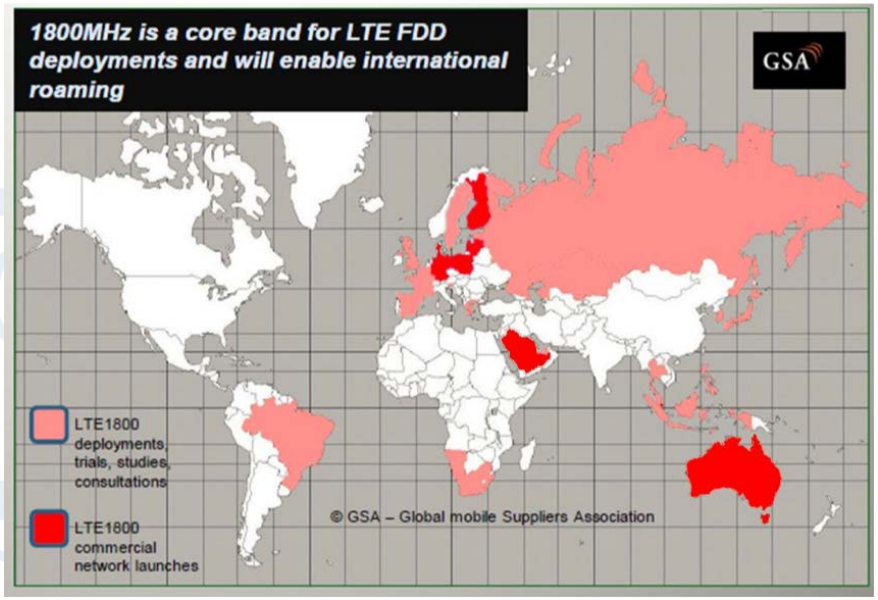
Pilot Country: Nepal

- Key recommendations from draft WBB Masterplan include:
- Flexible rights of use should be instituted for key wireless spectrum allocations with technology neutral use including WCDMA @ 900 and LTE @ 1800 MHz
- Radio Act could be amended to provide explicit rights on spectrum management and licenses
- Nepal should utilise key spectrum below 1 GHz (especially 700 MHz) in light of dominant position of mobile services and WBB going forward.
- Current debate regarding the price that should be paid for 3G spectrum and other spectrum allocations. Benchmarking may be necessary.

- There is a need to encourage better, more affordable WBB services by promoting competition, including possible facilitation of new entrants.

- Government should aim to provide at least total of 442 MHz for mobile services by 2015 in the 700, 900, 1800, 2100 and 2300 MHz bands and then 760 MHz by 2020. It should ensure spectrum is utilised on a national basis to maximise coverage.

- An infrastructure sharing framework should be developed to minimise duplication.



Countries with UMTS 900 deployments include: Australia, Bulgaria, Croatia, Estonia, Faroe Islands, Finland, France, Germany, Ghana, Greenland, Hong Kong, Iceland, Latvia, New Zealand, Poland, Qatar, Romania, Russia, Slovenia, South Africa, Spain, Switzerland, United Kingdom, Ukraine and Venezuela.

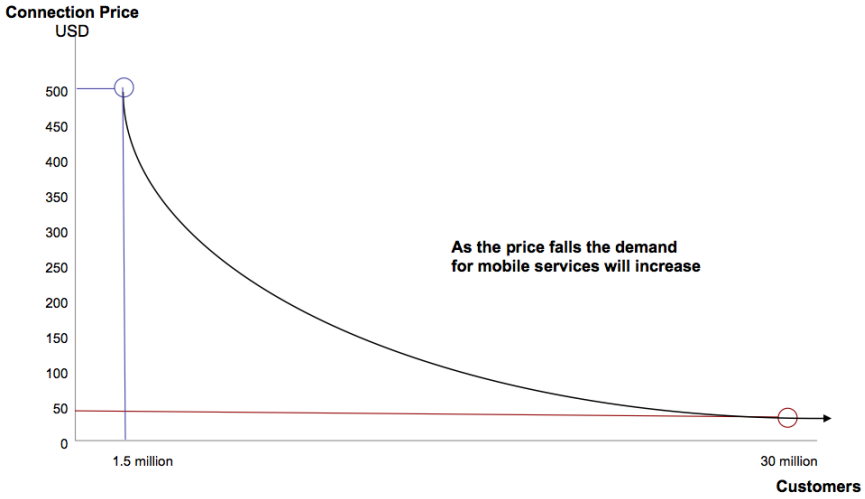
Pilot Country: Myanmar

- Key recommendations from draft WBB Masterplan include
- Provision of voice services is a priority in Myanmar with wireless broadband services a secondary objective.
- Need to commit early to legal and regulatory reform. New legislation should provide clarification for licensing and frequency management.
- Government has ambitious 30 million line rollout target, which will require investment of at least USD 1.5 billion. Achievement of this objective will require support from new and existing industry players.
- Current industry structures (monopoly) are sub-optimal for achieving policy objectives.

- Myanmar has no UHF television, meaning 700 MHz frequency is available for use. There is therefore scope for new spectrum allocations in 700, 850 and 900 MHz bands.

- Mechanisms for the protection of assigned frequencies/licensees need to be put in place, including monitoring of licensed technical parameters, resolution of interference.

- Infrastructure sharing framework should be developed to minimise duplication from start of competition (if it is approved).



- Deployment of most efficient technologies available should be encouraged to provide affordable services. Early LTE deployment is possible to support high speed wireless broadband services.

- Greater high speed international connectivity needs to be secured by obtaining long-term capacity on cable systems such as SEA-ME-WE 4.

Pilot Country: Samoa

- Key recommendations from draft WBB Masterplan include inter alia:
- Samoa should utilise key spectrum below 1 GHz spectrum resources in light of the dominant position of mobile services and WBB going forward.
- The Samoan Government considers using existing GSM infrastructure a sensible way of fast-tracking the move towards widespread wireless broadband take-up. OOTR has authorised utilisation of eGSM frequency for wireless broadband (e.g. WCDMA at 900 MHz).
- Investments in backhaul transmission capacity are required to facilitate deployment of WBB services with high quality of service and higher end-to-end speeds.

- Improved infrastructure will help to increase penetration of broadband services. The Samoan Government is also exploring facilitating increased international connectivity given bandwidth demands from wireless broadband penetration.

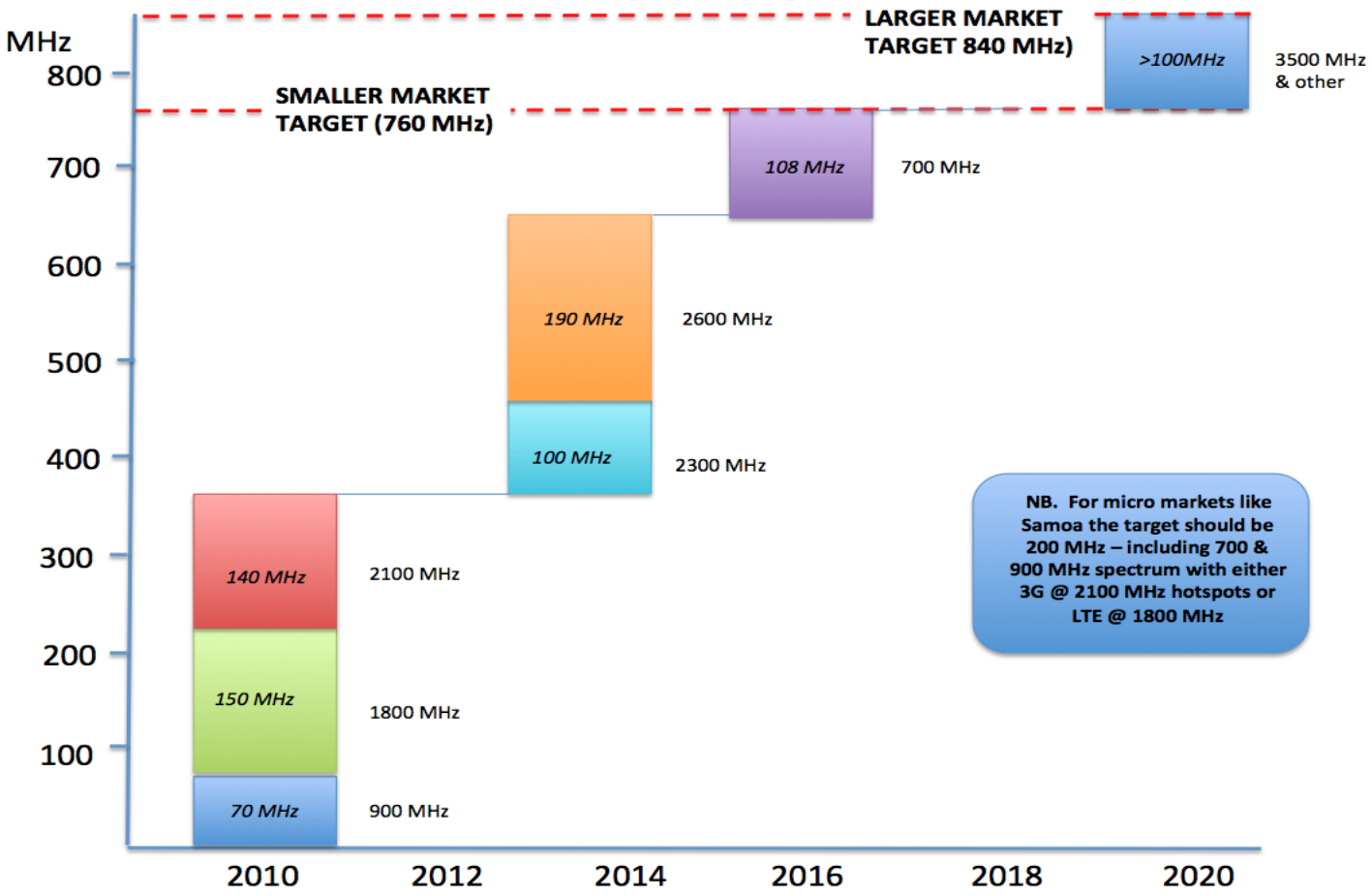
- Samoa is capable of providing high speed broadband to the entire population with its current mix of technologies utilising spectrum below 1 GHz.

- There is a need to ensure that operators are given the opportunity to utilise the most efficient technologies available. The Government should facilitate the deployment of LTE technology to take advantage of higher performing mobile broadband services.

- There should continue to be a high degree of spectrum availability for wireless broadband services, with a focus on the most effective means of pricing spectrum

- Greater high speed international connectivity needs to be secured through long-term capacity on key cable systems.

Overall Spectrum Requirements in the WBB – Summary



Estimates of terrestrial spectrum requirement for IMT

RATG definitions

RATG 1: Pre-IMT, IMT-2000 and its enhancements	RATG 2: IMT-Advanced (new mobile access and new nomadic/ local area access)	RATG 3: Existing radio LANs and their enhancements	RATG 4: Digital mobile broadcasting systems and their enhancements

Total spectrum requirements for both RATG 1 and RATG 2 in the year 2020

	Total spectrum requirements for RATG 1	Total spectrum requirements for RATG 2	Total spectrum requirements RATGs 1 and 2
Lower user density settings	440 MHz	900 MHz	1 340 MHz
Higher user density settings	540 MHz	1 420 MHz	1 960 MHz

RATG 1 (i.e. pre-IMT, IMT-2000, and its enhancements) and
RATG 2 (i.e. IMT-Advanced) for the year 2020

Source: ITU-R M.2290 (12/2013)

The key to ensuring affordable WBB services is in addressing costs at each stage of the end to end eco-system.

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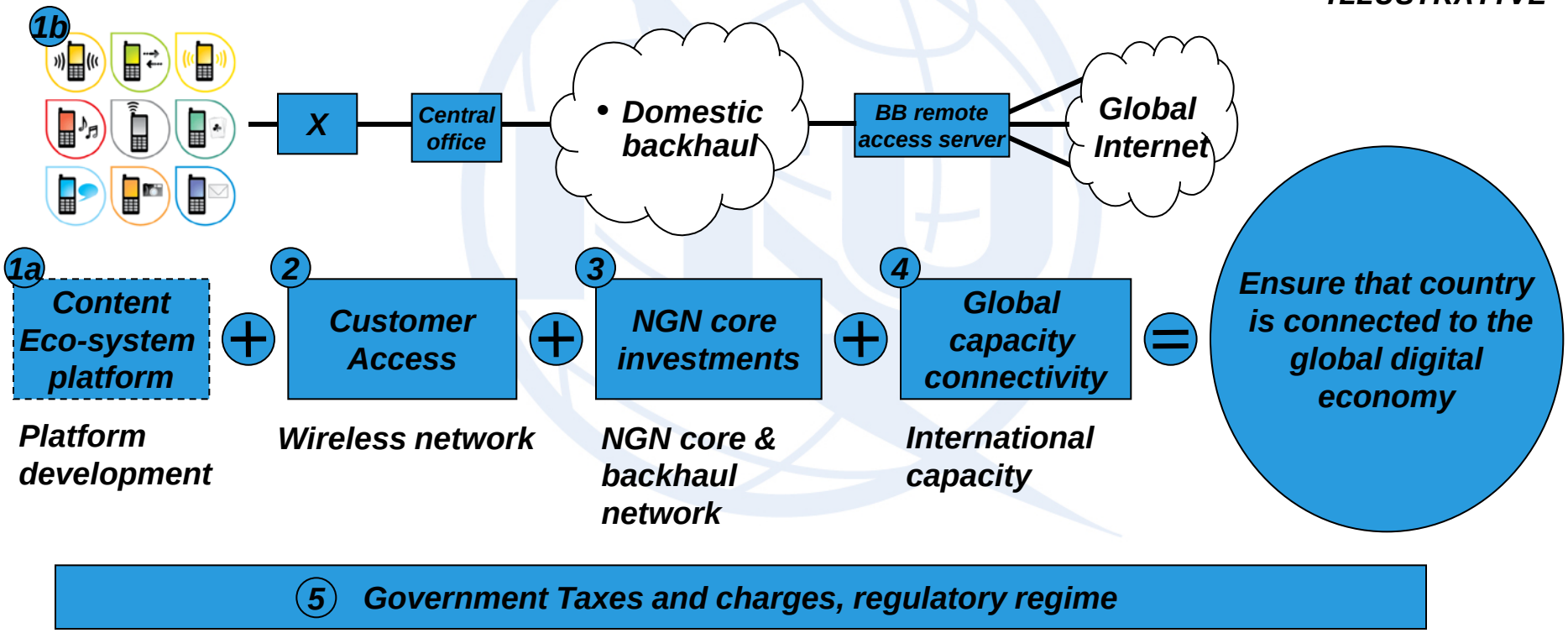
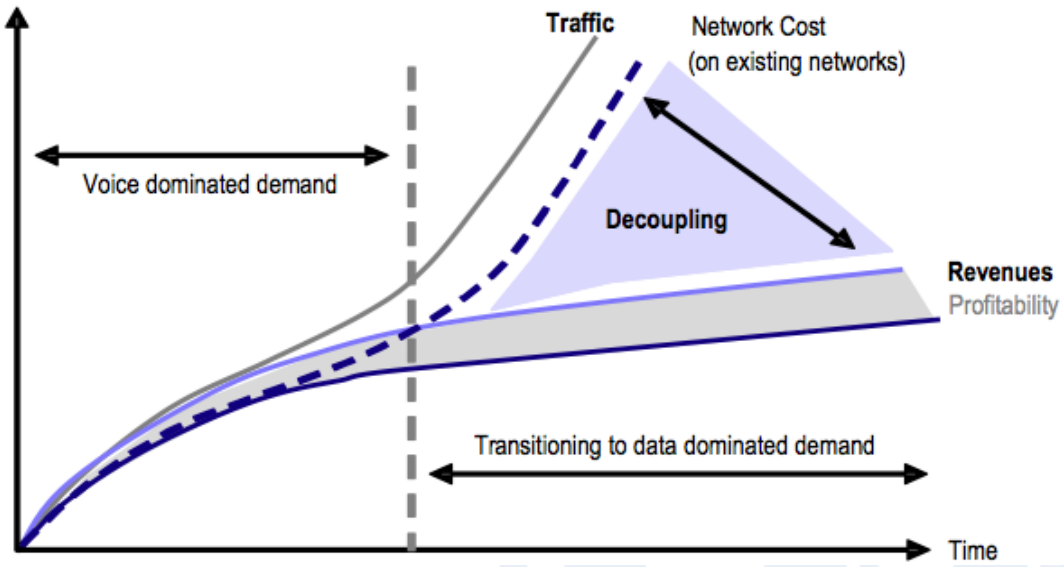


1 *Reducing the cost of devices and content*

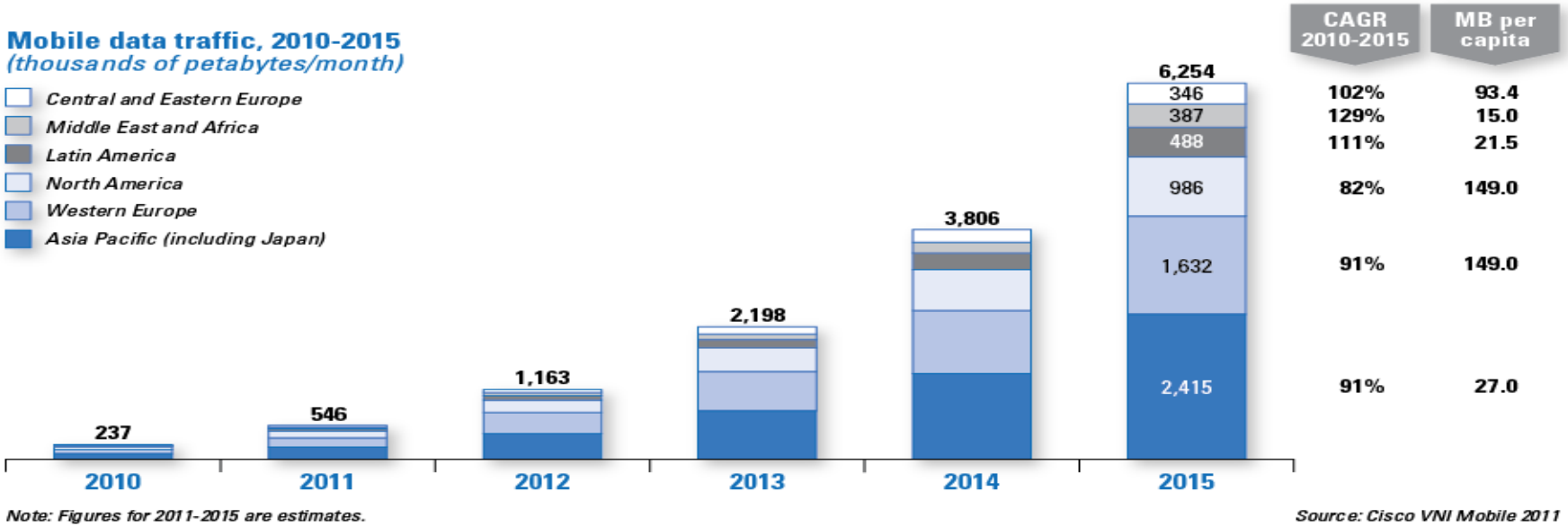
Input cost	Description	Governmental Role
Content / Apps	Content and applications used by users	• Governmental information to be made freely available for mobile apps • Mobile payments facilitated • Encourage local online content/apps • Facilitate domestic IXs • Support for local language and culture • Improve skillsets/training
Devices / end user devices	Handsets, tablets, netbooks, mifis etc	• Reduce custom duties • Select harmonised technologies and spectrum allocations provide access to lower cost technologies

2 *Reducing the cost of wireless access and customer access*

Input cost	Description	Governmental Role
Spectrum	Wireless broadband spectrum – IMT bands	• If auctioned, set reasonable min. fees • Consider spectrum caps to ensure no monopolisation of spectrum • Allow flexible use eg for WCDMA @ 900 MHz and LTE at 1800 MHz • Support use of sub-1 GHz for coverage • Support spectrum leasing and trading – to best possible use • Support regional and global allocations of spectrum for WBB • Facilitate tower approvals, mandated building access, arbitration on costs
Network equipment	BTS, RAN, switches, transmission etc	• Reduce custom duties • Select harmonised technologies and spectrum allocations provide access to lower cost technologies • Mandate infrastructure sharing – both passive and active



Importance of getting the WBB technology and spectrum correct given substantial increases in demand



Note: Figures for 2011-2015 are estimates.

Source: Cisco VNI Mobile 2011

3 Reducing the cost of NGN Core and backhaul

Input cost	Description	Governmental Role
Rights of way, Spectrum	Microwave, fibre etc	• Free up spectrum for microwave use • Facilitate rights of way, planning etc for fibre routes
Trans-mission equipment	Transmission equipment, optical fibre etc	• Reduce custom duties • Permit multiple vendors to bid • Select harmonised technologies and spectrum allocations provide access to lower cost technologies • Mandate infrastructure sharing passive • Facilitate backhaul provisioning

4 *Securing & Reducing the cost of Global capacity & connectivity*

Input cost	Description	Governmental Role
Access to cable landing stations etc	Microwave, fibre etc	• Establish rules for access to submarine cable landing stations, carrier hut,etc • Mandate competitive backhaul to/from cable landing stations
Internat-ional capacity	IRUs, international capacity	• Facilitate connectivity to high capacity and multiple systems • Government to aggregate demand from multiple operators • Government to consider capital cost assistance for spurs and connectivity • Approve submarine cables • If landlocked, then facilitate overland connectivity • Allow resale of international capacity

5 *Reducing Govt Taxes & charges, improved regulatory regime*

Input cost	Description	Governmental Role
Taxes	Spectrum costs, specific telecoms fees & charges	• Partner with the sector to facilitate economic growth rather than seeing sector as a revenue raiser • Ensure taxation neutrality
Regulatory regime	Sector policy, regulation etc	• Improve regulatory certainty to reduce risk premium • Ensure reasonable return on investment – ensure competition results in normal profit on capital employed eg non-monopoly rents • Develop quality regimes in relation to infrastructure sharing, spectrum trading, etc

Current Status of National Broadband Policy (NBP)

- **6 countries fully approved** the NBP at the highest level while **the rest are close** to finalizing
- All these policies set out **clear vision, key objectives** and **principles** as well as **short/mid-term goals**
- Provided with thorough **BB implementation action plans** (and responsible organizations and deadlines) including:

✓ Broadband availability targets
✓ Plans for reducing regulatory burdens
✓ Review of licensing/spectrum management
✓ Improving adoption, affordability
✓ Universal Service Obligations
✓ Sector-specific application (e-gov, e-health, e-education, etc.)
✓ Fostering innovation and local service/contents

Approved

Bhutan, Brunei
Fiji, Indonesia
PNG, Nepal

Under Review

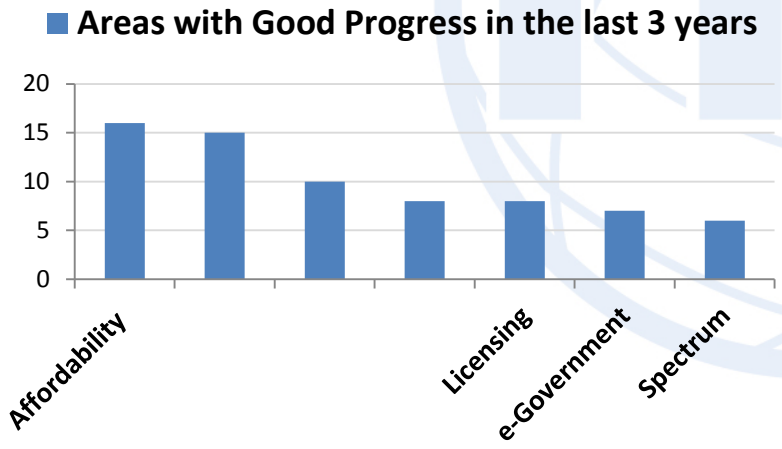
Bangladesh
Cambodia, Lao PDR
Pakistan

In Draft

Philippines, Myanmar
Marshall Islands
Samoa, Vanuatu

NBP Progress Survey in 2015

- **Survey to assess the progress in NBP implementation**
  - Expert survey in 16 Asia-Pacific countries (governments /regulators) (June 2015, In Progress)
- Overall, the studied countries reported
  - made **good progress** in ***BB affordability, availability and regulatory reform***
  - **slow progress** found in ***universal services*** and ***protecting consumers or QoS***

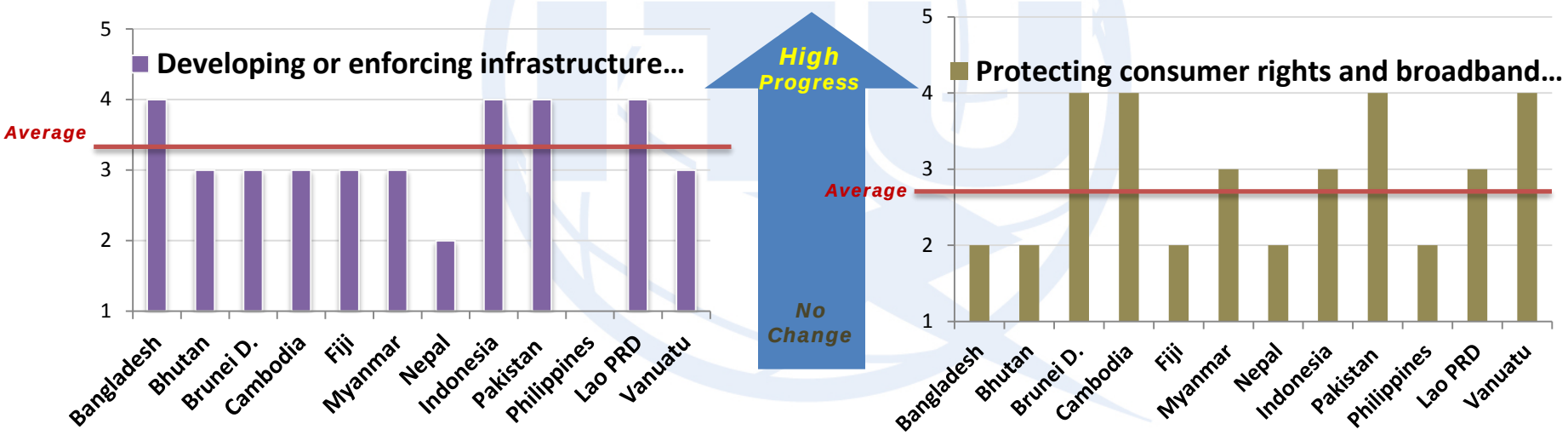


Country	Entry BB Definition (up/down)	BB Availability Target (Set by the NBP)
Bangladesh	1 Mbps / 1Mbps	Not specified
Bhutan	512 kbps	80% of the population
Brunei D.	2 Mbps	80% of the households by 2017
Cambodia	512 kbps	90% of the population by 2018
Fiji	256 kbps	50% of the population by 2018
Indonesia	512 kbps	75% of the population by 2017
Lao PDR	In discussion	60% of the post offices as community access points by 2016
Marshall I.	256 kbps	Not specified
Myanmar	Not specified	Not specified
Nepal	512 kbps	45% of the households by 2018
Pakistan	256 kbps	50% of the population by 2017
Papua N.G.	512 kbps	50% of the population by 2018
Philippines	In discussion	Not specified
Vanuatu	2 Mbps	98% of the population by 2018

2015 NBP Survey: Barriers and other information

•Main barriers to broadband adoption:

Barriers to Network Availability	• Geography • Lack of funding on Infrastructure • Lack of market dynamics (competition)
Barriers to BB Adoption	• Lack of awareness on broadband benefits • High retail price • Lack of attractive online services

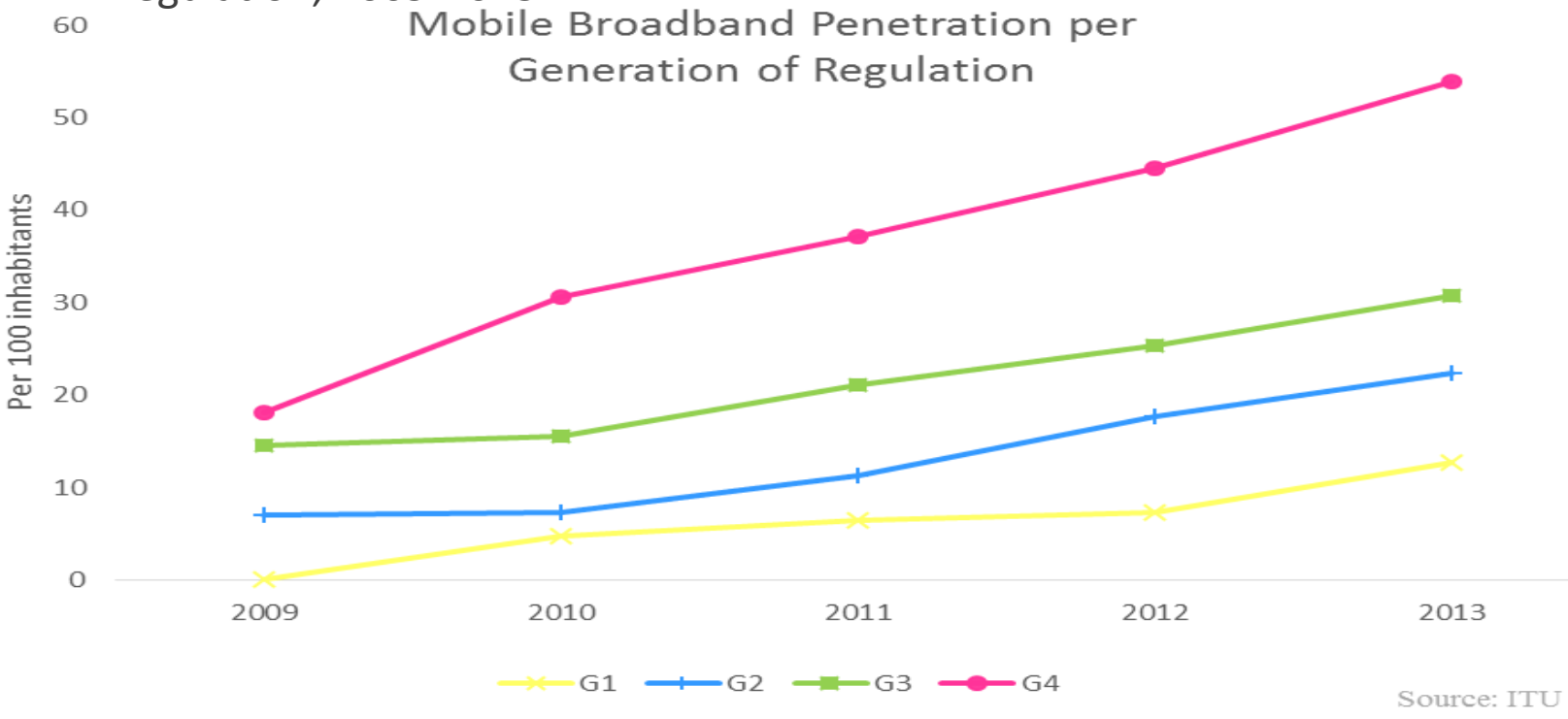


Monitoring the Progress in NBP Implementation: tentative findings

- Countries are **making steady progress** particularly in the areas of **availability and affordability** as guided by the national broadband policy and its detailed implementation action plans
- Broadband availability and adoption have improved in recent years (due to increasing mobile broadband) while the lack of funding, market dynamics and demand-triggering services still remain as critical barriers
- Continuous international **support on regulatory issues** are still needed
- Further assistance may be necessary for **stimulating the broadband market** by incubating locally relevant content, innovative services and entrepreneurship

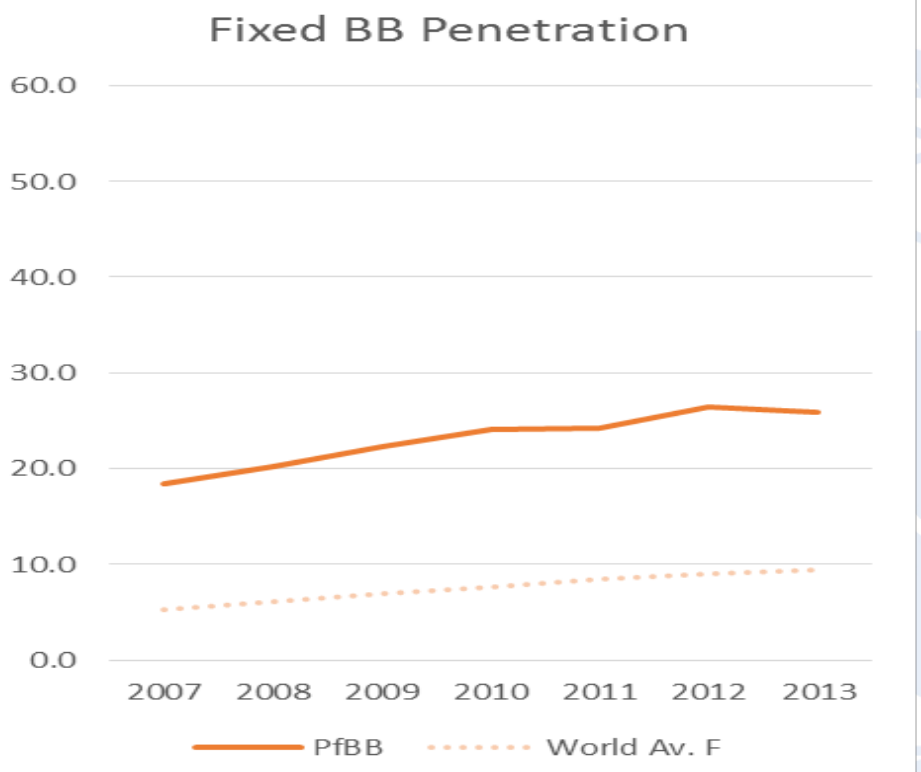
Better Regulation – Greater Growth?

Evolution of mobile broadband penetration, by generation of regulation, 2009-2013



Note: Based on data for 122 countries over the entire period.
Source: ITU.

Winning Formulas for Fixed Broadband



- Competition in DSL/cable
- Fixed number portability enabled
- Infrastructure sharing for fixed either allowed or mandated
- Converged licensing framework in place
- National broadband plan adopted

Source: ITU

Role of Stakeholders

Role of Government

- Stipulate clear vision and strategy in the national agenda for development
- Build Digital Highways: Support national backbone networks
- Create Critical Demand : e- government applications
- Provide Tax Incentives for Broadband
- Encourage Deployment of Low Cost Computing Devices
- Build the skills to harness the full potential of broadband

Role of Regulator

- Predictable regulatory framework & Mandatory transparent consultation process
- Converged licensing framework
- Promoting competition
- Investment in infrastructure : Incentives based regulation
- Timely dispute resolution mechanism
- Infrastructure sharing framework

Role of Industry

- Investment in infrastructure
- Innovation and deployment of new technologies
- Develop different business models and introduction of e- government services
- Infrastructure Sharing
- Join PPP initiatives for a win-win outcome

Conclusions

- WBB technologies offer significant promise to emerging market to secure WBB services and applications which are affordable and comparable to those in developed countries. The 'digital divide' can be bridged by utilising those technologies.
- Key thing is that shared access permits the costs of access to be shared which is more difficult for fixed networks. Upgrades to WBB can also be done more easily and consumers can buy services on an incremental (often pre-paid) basis.
- Countries in Asia-Pacific Region according high importance for establishing and implementing National Broadband Plans / Policies
- Awareness and development of applications such as e-government, e-education, e-health are key for uptake of ultra broadband
- Industry has critical role in innovation, interoperable standards investment & infrastructure development