
Policy Enablers to Promote Wireless Broadband in Rural and Remote Areas

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Overview

Broadband growth and policy: The context

Rural and remote telecommunication policy framework – key building blocks

Policy enablers to promote market driven penetration

Policies Directly Incentivising Rural / Remote Penetration

ITU initiatives



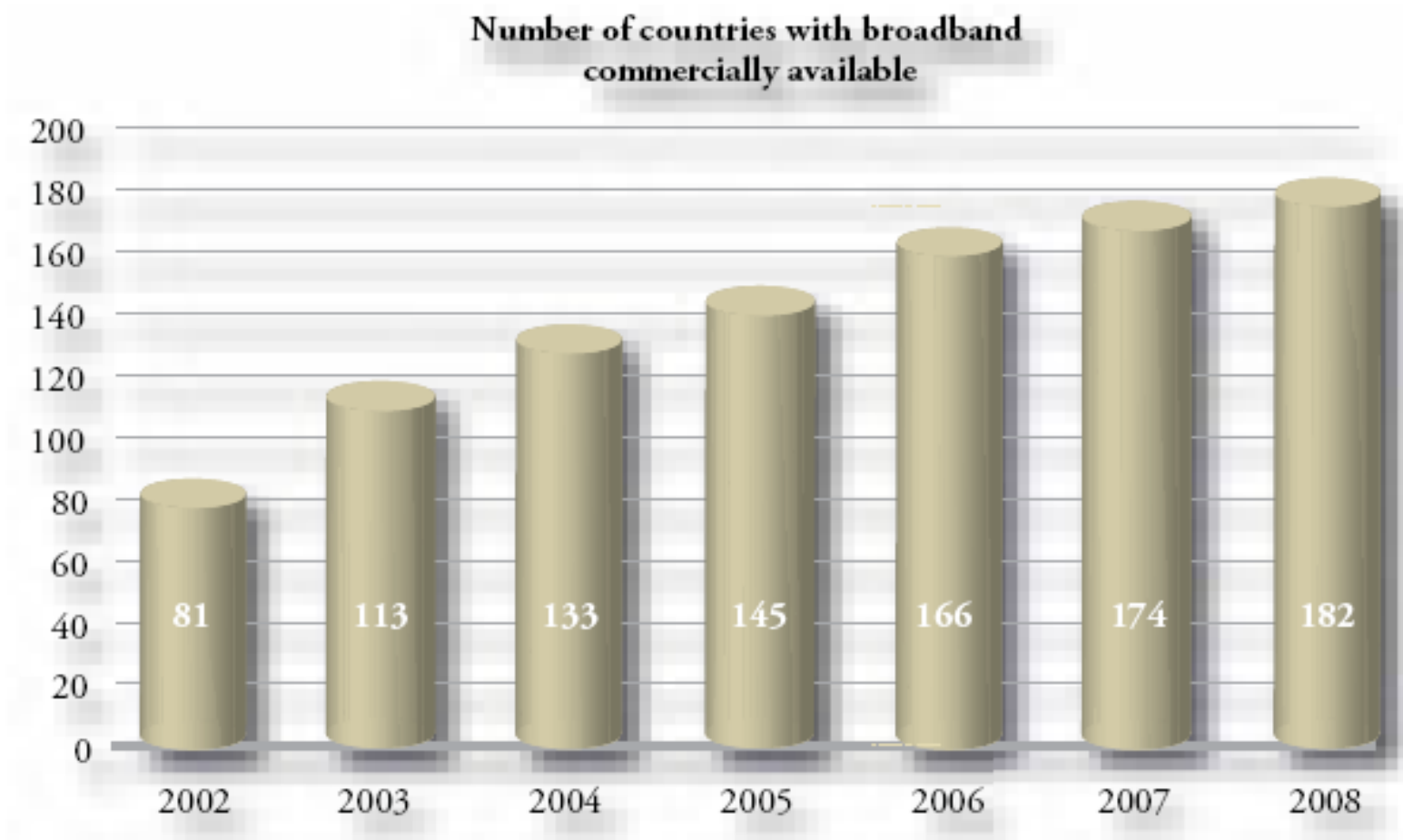
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Broadband growth and policy: The context

“In the 21st century, affordable broadband access to the Internet is becoming as vital to social and economic development as networks like transport, water and power”

- Dr Hamadoun Touré, ITU Secretary-General

Broadband in growing

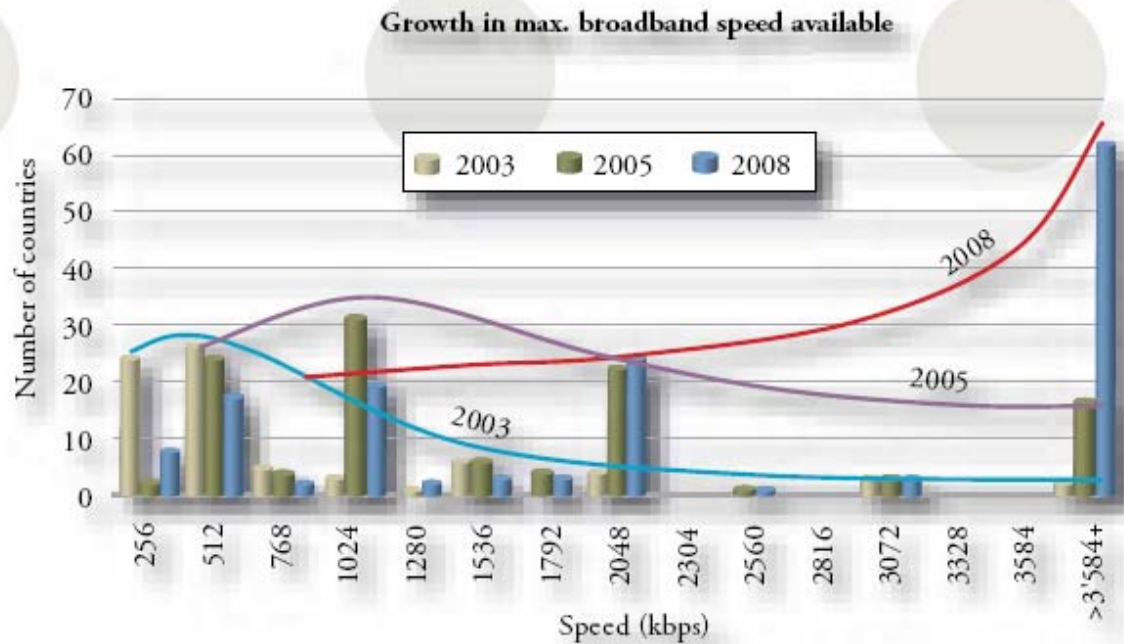


Source: ITU



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At ever faster speeds.....



Source: ITU.

Note: commercial broadband is defined as Internet access at speeds of 256 kbps or more. These speeds are maximum commercial speeds advertised and are not always available (or achievable) due to traffic, utilization etc.

Source: ITU

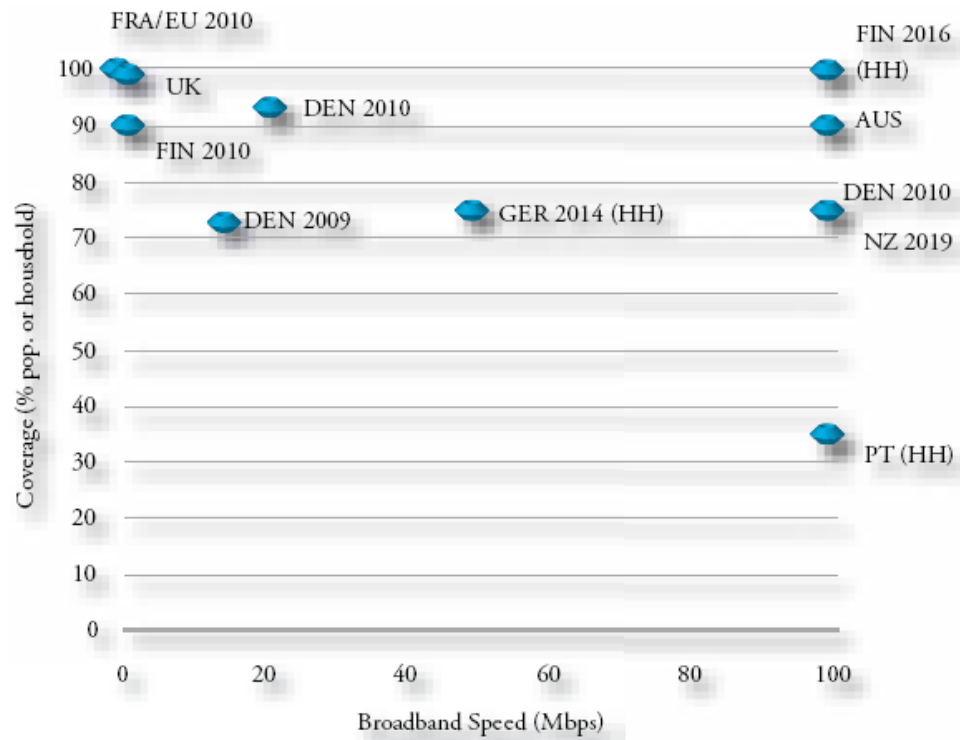


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Governments are stimulating broadband penetration

Targets Announced in Stimulus Plans to Date

Figure 5



Broadband stimulus plans have focused on providing broadband (sometimes at specified speeds, using specified technologies) to various priority groups or communities

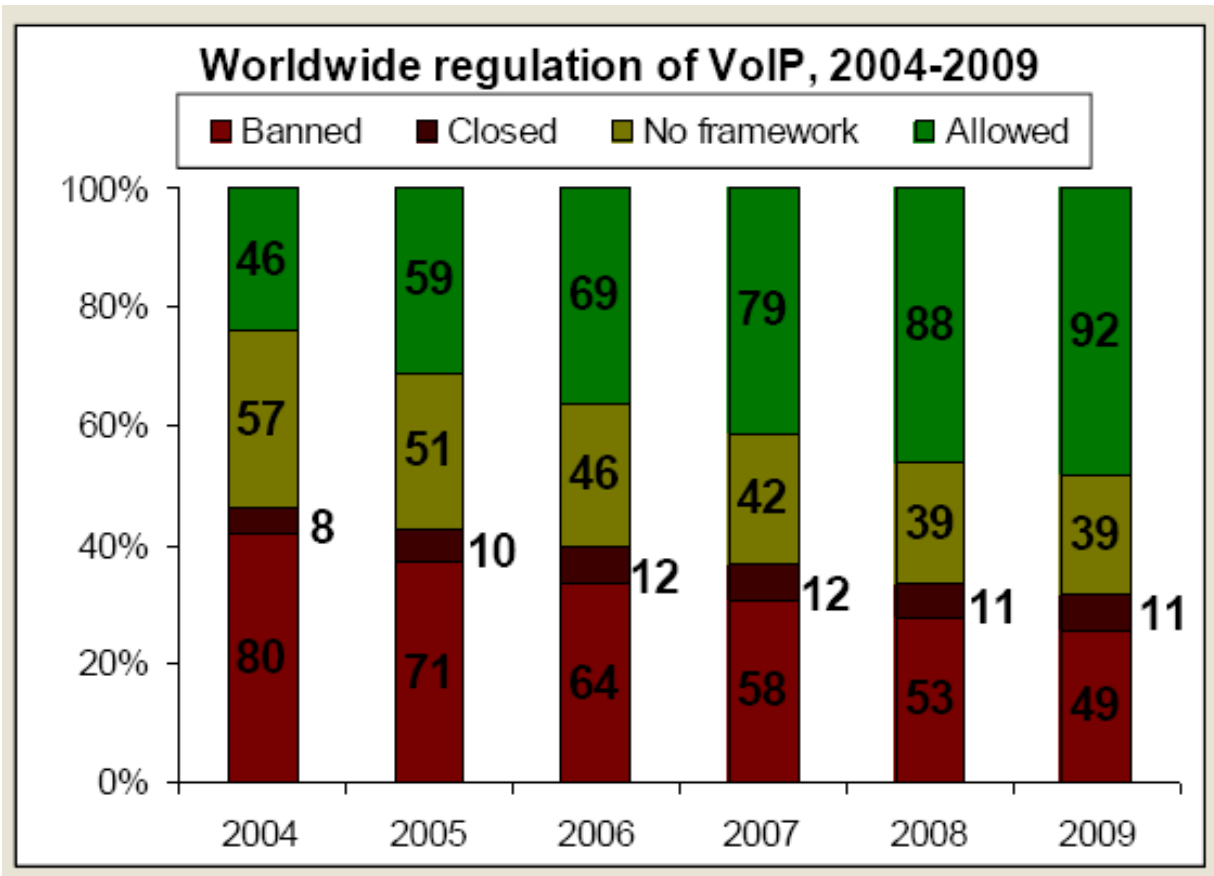
Source: ITU

Source: ITU. Note: HH = household, with the target specifying household coverage.



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Regulators are embracing IP technologies



Source: ITU. This time series of data is available for 191 countries for 2004-2009.

Note: 'Closed' means countries where wholesale VoIP is permitted, but retail VoIP is banned, as well as those countries where only the incumbent is licensed to provide VoIP. Broadband services are defined as Internet access at speeds of 256 kbit/s or more.

Broadband: a key driver of economic growth I

- ❖ Broadband: key means of accessing information
 - ❖ Provides access to **information**, which is public good and is essential to all forms of economic activities
 - ❖ Provides access to **new applications** & allows companies to explore new business opportunities, access customers and obtain information about market prices.
 - ❖ Provides better access to information that makes markets function more **efficiently** and raises producer incomes.
 - ❖ Provides access to information on the performance of government that helps improve government **accountability and governance**.
 - ❖ Broadband networks are increasingly being used to deliver **public services** such as financial services, healthcare and e-voting.

Broadband in developing countries will follow a similar path, but with much greater emphasis on wireless networks. Expanding affordable access to broadband is a top priority for governments of developed & developing countries.

Source: Dr. Tim Kelly, infoDev/World Bank. The views expressed herein are those of the author only and do not necessarily reflect the views of the World Bank Group or the Governments it represents.



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Broadband: a key driver of economic growth II

❖ ICT investments can positively impact jobs, productivity, revenue growth and innovation.

- ❖ In the US, a 7% increase in broadband adoption could potentially result in a projected 2.4 million annual increase in jobs in the US, with a US\$ 134 billion economic impact per year (Connected Nation report 2008).

Source: John Davies, Vice-President Sales & Marketing & General Manager, Intel World Ahead Program, Intel Corp

Table 1: Impact of Investments in Broadband Infrastructure - for Canada and the UK

Impact of Investment in Broadband Infrastructure	Case study of investment in community broadband infrastructure	Case study of investment in e-learning, telemedicine & broadband
Initial Investment in broadband infrastructure by government	USD 10 million	USD 10 million
Leveraged Investment (from other sources - private sector, municipal authorities, etc.)	USD 116 million	USD 101 million
Total Investment	USD 126 million	USD 111 million
Contribution to GDP from total investment	USD 164 million	USD 150 million
Contribution to Total Employment*	2,100 jobs	4,800 jobs
Contribution to Taxes*	USD 61 million	USD 32 million
<i>*Note - impact on employment & taxes varies by types of jobs & investment made.</i>	<i>SNG (2003) for DTI, UK Government.</i>	<i>SNG (2004) for Industry Canada.</i>

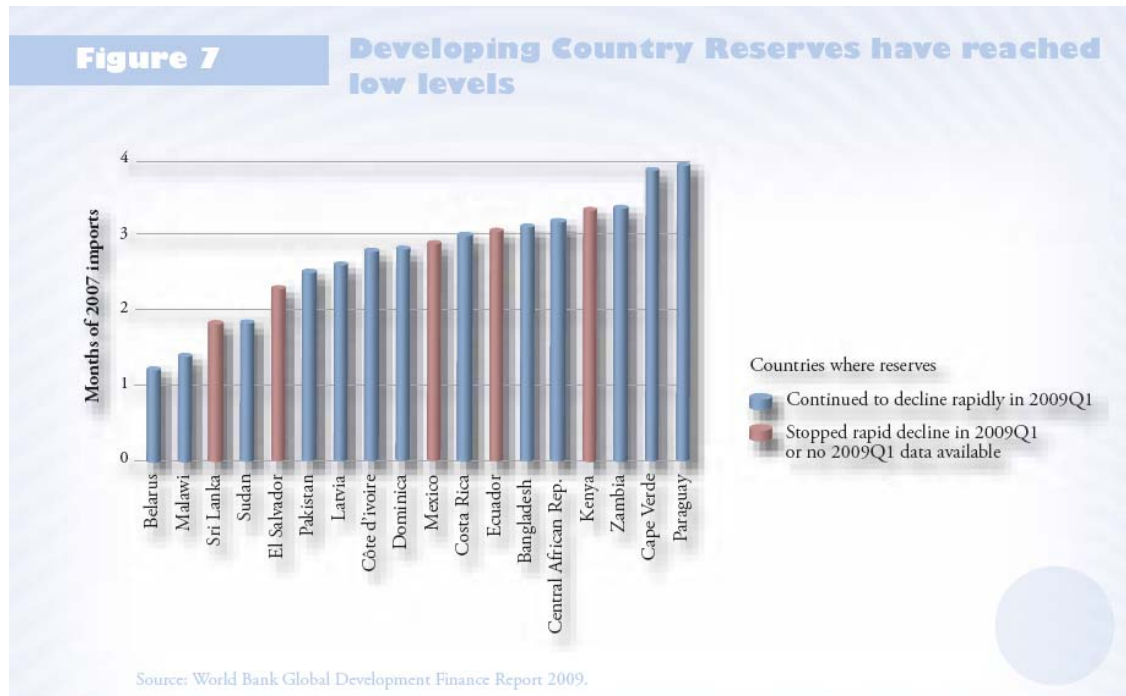
Source: Strategic Networks Group (SNG), at http://sngroup.centraldesktop.com/sngpublic#_fn1



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There are also challenges posed

❖ According to the World Bank, reserves of some developing countries have now reached worryingly low levels (**Figure**), so some countries have limited resources to respond to the recession. Nevertheless, some countries have launched impressively large stimulus plans.



The roll-out of networks offering 50-100 Mbps bandwidth in OECD countries pose challenges of reshaping **the digital divide** in terms of Internet access speeds.

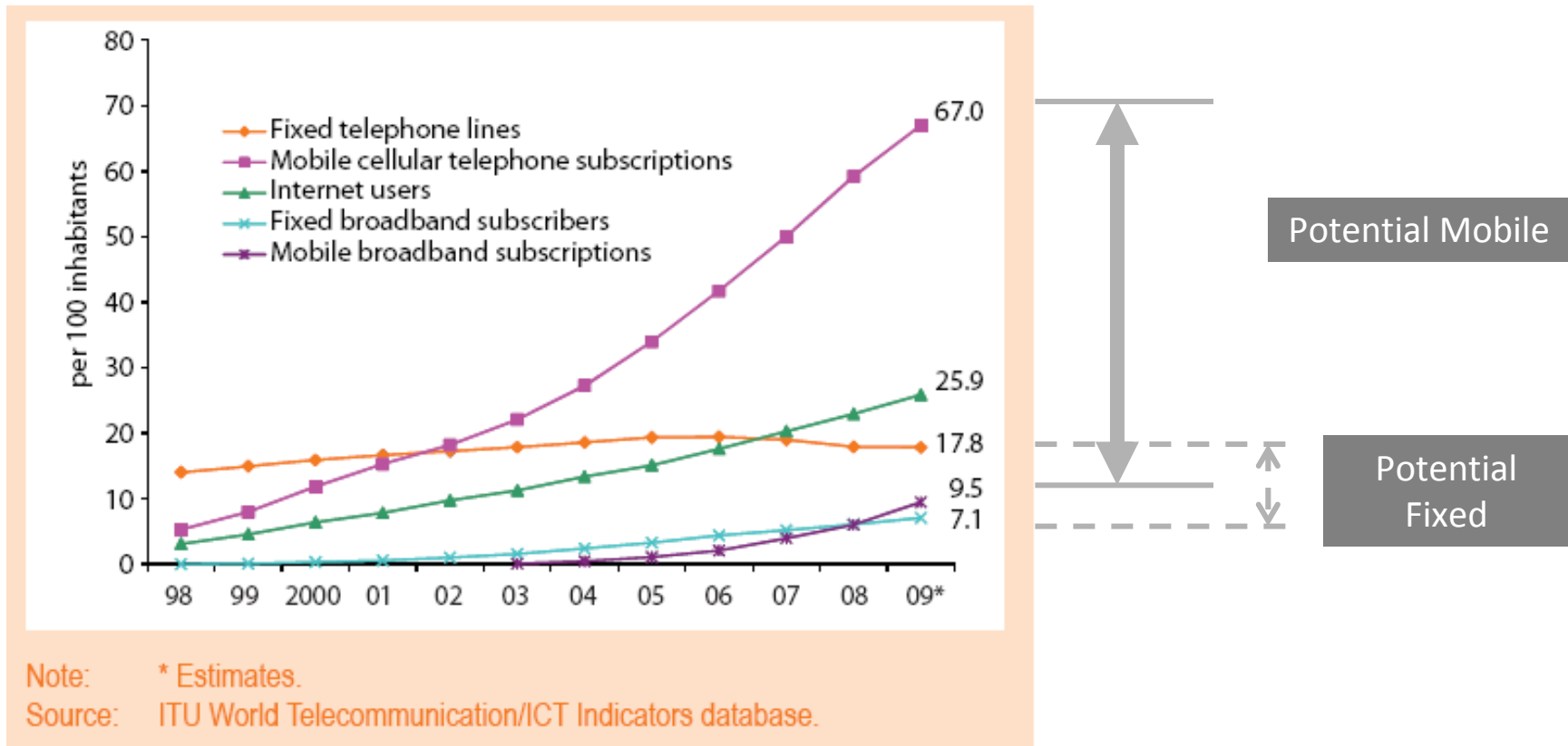
Potential Risks

- ❖ Picking Technologies – Fibre Vs Wireless
- ❖ Picking Communities – Urban Vs Rural



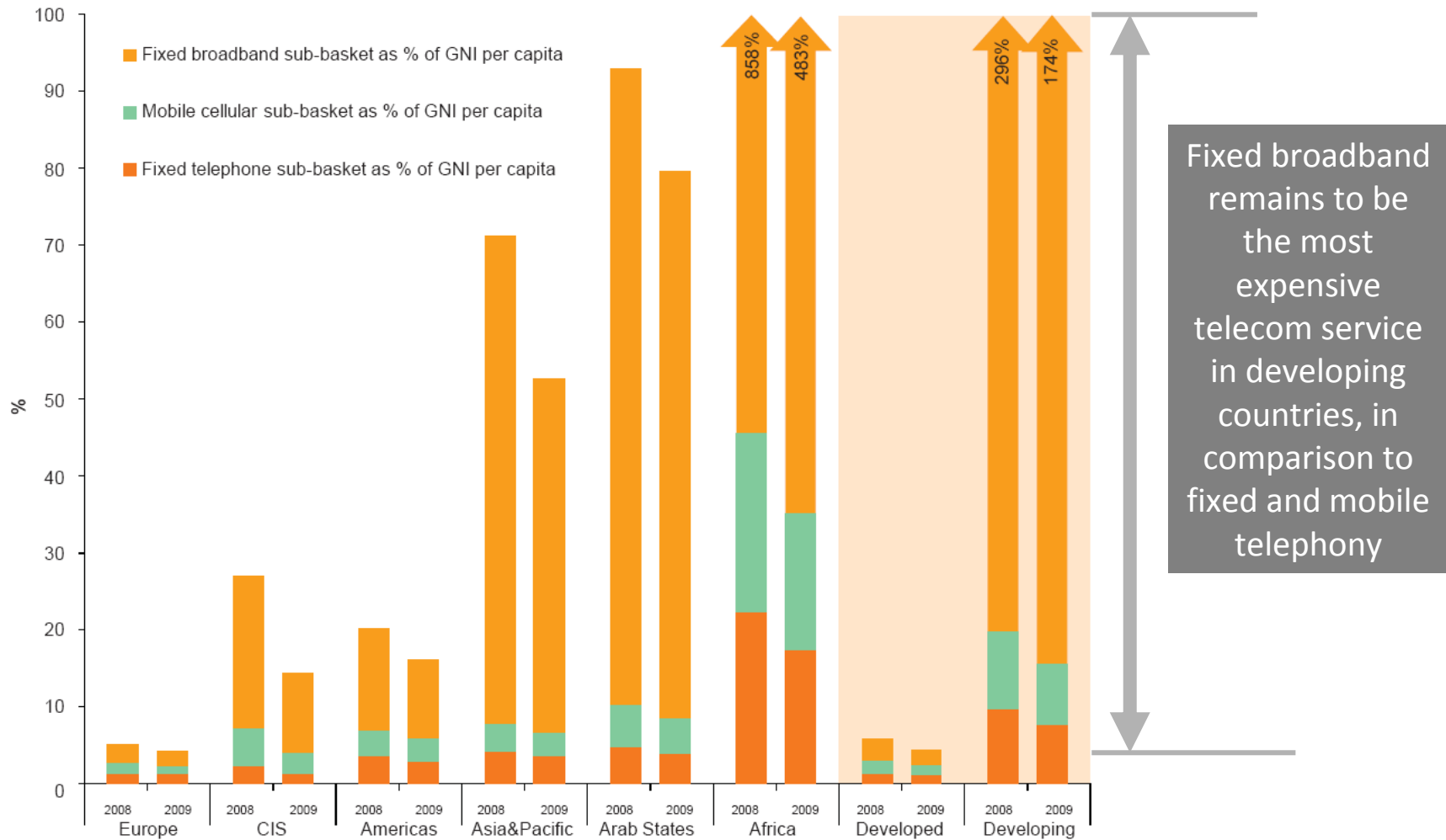
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Challenges continued



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ICT still expensive for developing countries



ICT Price Basket by region and by level of development, 2008-2009

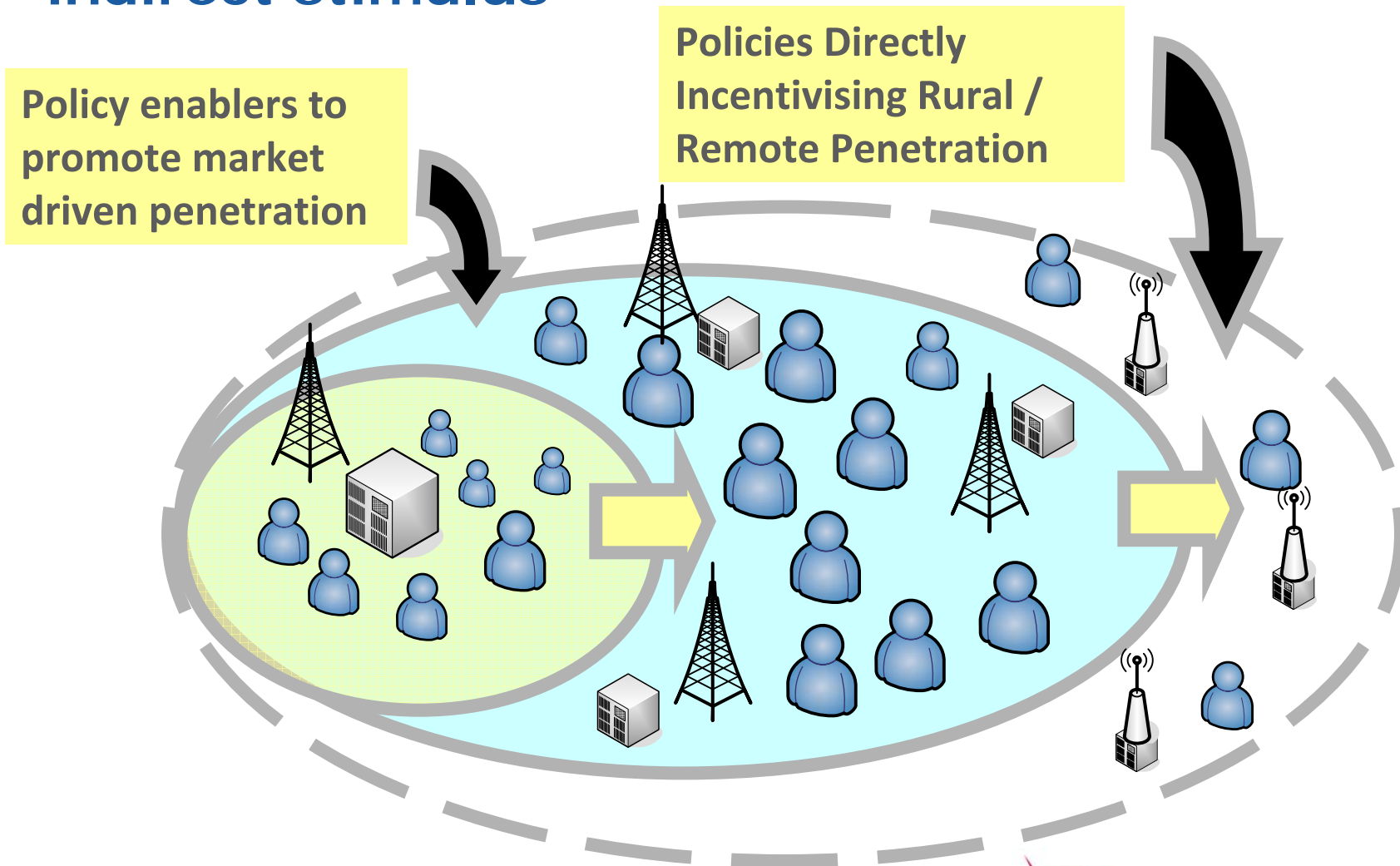
Source: ITU



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Rural and remote telecommunication policy framework – key building blocks

Policy elements can provide direct or indirect stimulus



Policy enablers to promote market driven penetration

- Promoting penetration through enhanced competition
 - Saturation in urban areas generate first mover incentives for service providers to move to rural and remote areas
 - **Licensing regimes enabling convergence promotes innovation (discussed later)**
 - Efficient Interconnection regimes to enable service delivery

- Policies to ensure availability of scarce resources and its use in a timely and efficient manner
 - **Spectrum Management (discussed later)**
 - Right of way e.g. Tower hosting etc. in wireless environment

- Availability of content
 - Online public service content through other policies such as e-Governance, e-health, e-education
 - Online commercial content such as Media, e-Commerce

- User Confidence in use of the infrastructure and services
 - Cybersecurity related policies



Changing licensing policies to enable convergence

Legacy Licencing

Service specific licencing with heavy regulation (entry fees, interconnection etc.) on fixed and mobile licensees and very light regulation on ISPs

Recent trend

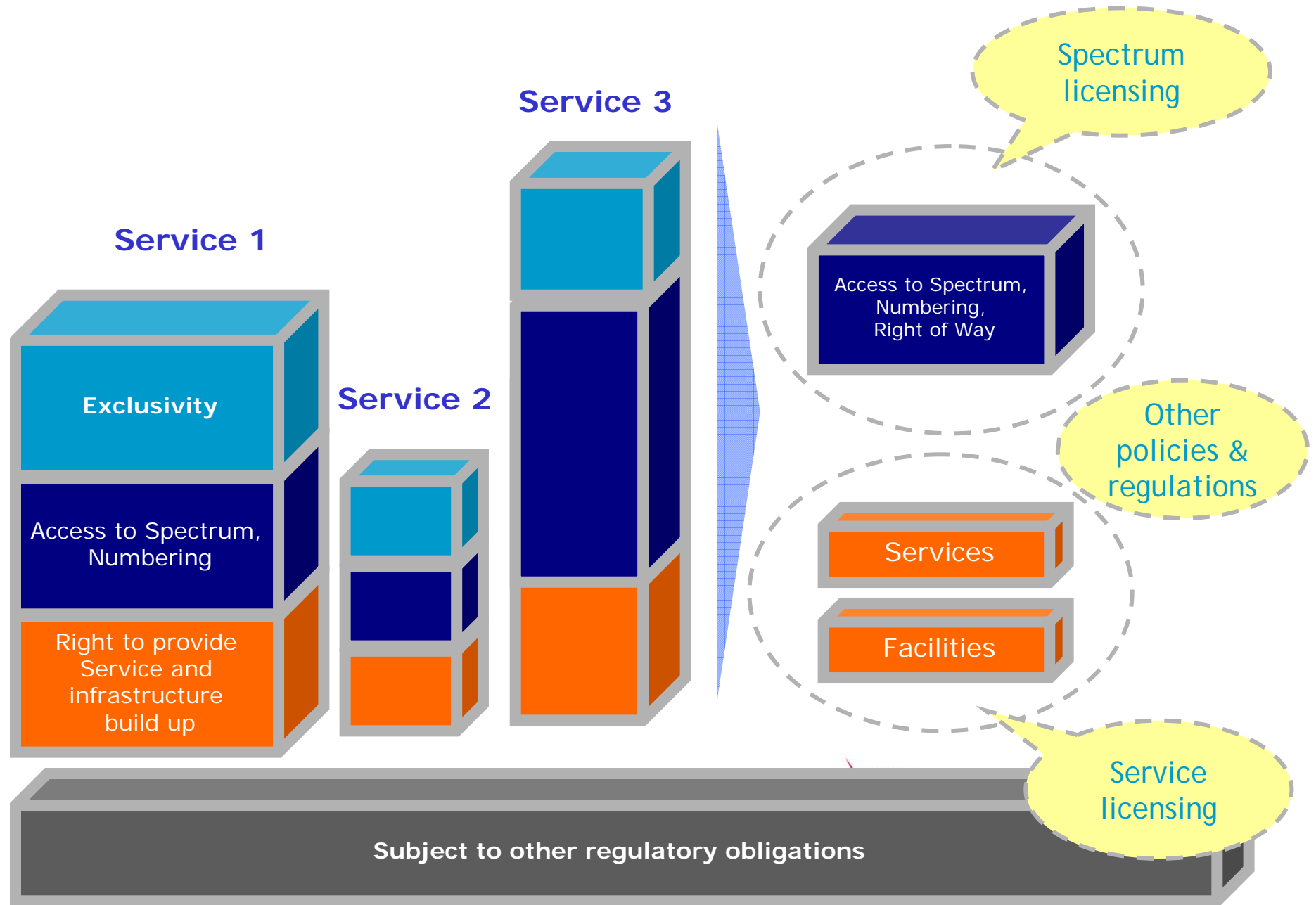
- Shift from service specific licence to technology and service neutral licensing regimes (Converged/Unified license and Authorizations)
- In general, allocation of spectrum and scarce resources are de-linked from the license
- Low cost of entry and annual licence fees

ITU ASP RO

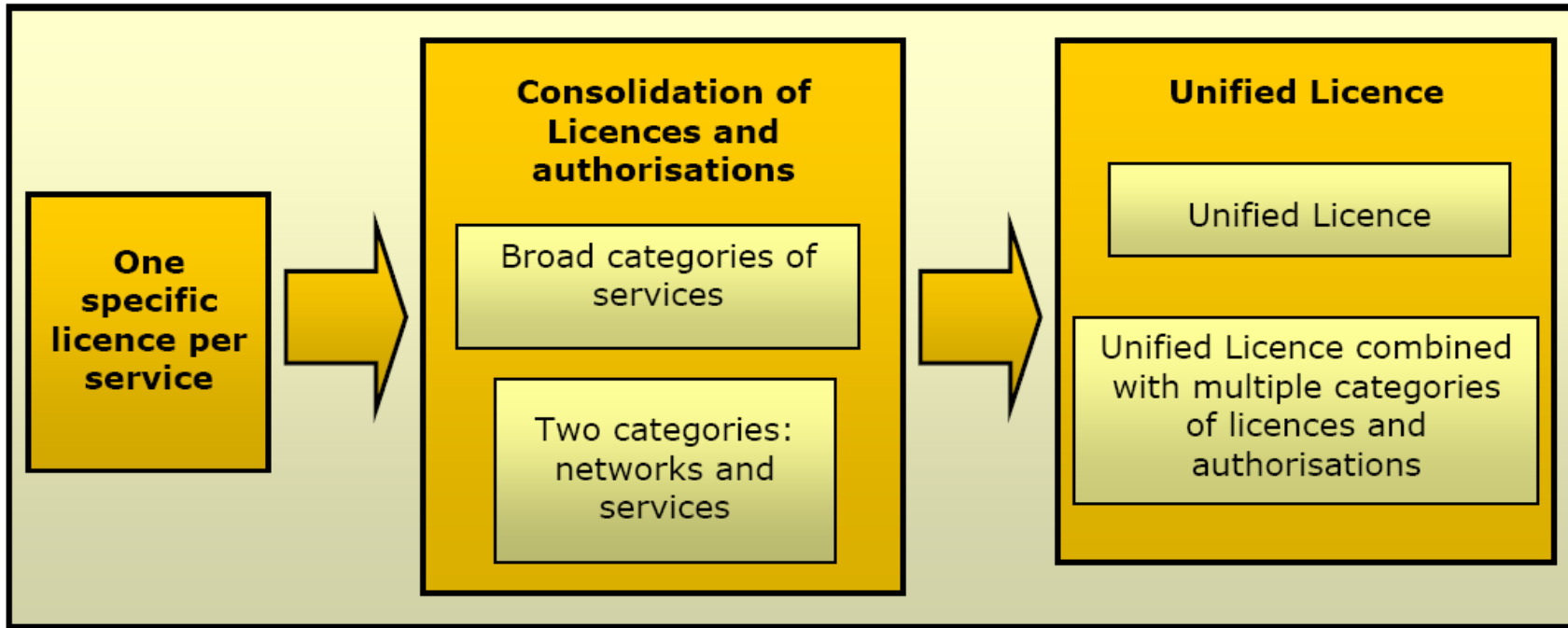


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Key Building Blocks of license



New Service Licensing Approaches



Examples

**Malaysia
Tanzania
Uganda
Singapore**

**Argentina
Botswana, EU member
states, Jordan,
Kenya, Nigeria,
Peru**

Source: Draft Report ITU-D Question 10-2/1:
Regulation for licensing and authorization
of converging services

Spectrum Management for BWA

Keeping in mind the issues of spectrum economics and technological advances, spectrum managers in the new broadband era face the challenge of achieving three separate but interrelated goals, simultaneously:

- (1) To provide the proper incentives for spectrum licensees, both existing and new, to invest in broadband services;
- (2) To expand consumer choices by enabling sustainable competition for similar services across multiple technological platforms; and
- (3) Implementing policies that discourage wasteful and anticompetitive behaviour resulting from uneconomic speculation and hoarding of spectrum.

Source: ITU Trends in Telecommunication Reform 2006, Sec 5.4, John Muleta



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Spectrum Regulatory Model for BWA -II

Existing Regulatory Models

- ❑ *Command and control* model, in which strict operating parameters and service rules define licensees' spectrum rights.

- ❑ *Exclusive rights* model, in which a licensee is given rights – which may be (within limits) transferable and flexible – to use a specified spectrum band within a defined geographic area and during a fixed period of time. In the current understanding of the exclusive rights model, spectrum use rules are primarily technical (as opposed to service-based), because they are designed only to protect the spectrum licensee and adjacent spectrum users from generating or receiving harmful interference – not to mold or develop a certain service or market structure.

- ❑ *Commons model*, or unlicensed model, which allows unlimited numbers of users to share a block of frequencies without giving any one user or group of users priority or individualized rights of use. Uses are limited only by technical criteria that specify bandwidth and emitted power but provide no enforceable rights to protect against interference. A well-known form of commons approach has been the deployment of WLANs using Wi-Fi technology.

Source: ITU Trends in Telecommunication Reform 2006, Sec 5.4, John Muleta



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Neutrality in the spectrum context

Neutrality, is a well-established concept in the broader telecommunication regulatory world. Because technologies and services are changing so rapidly, governments are advised to develop rules that do not depend on particular equipment standards or service types.

Implications of applying neutrality to spectrum licensing

An extreme interpretation of a neutral licensing framework would permit any technology to be used in any frequency band, and allow the deployment of any service in any frequency band. Licensees could radically alter their current spectrum use and migrate it to entirely different uses whenever they liked.

Three issues to move towards full neutrality

- **Interference** . The physics of radio-wave propagation vary at different frequencies.
- **Economics** . There are different economies of scale and coordination.
- **Institutions** . Full neutrality would be at odds with ITU's Radio Regulations.

Source: ITU Trends in Telecommunication Reform 2004, Sec 6.2, Chris Doyle

Examples: Australia, Guatemala, New Zealand

WRC-12 will discuss studies for the Resolution 951 (Rev.WRC-07), "Enhancing the international spectrum regulatory framework" according to *resolves* 1: "studies are to be continued by ITU-R, in order to develop concepts and procedures for enhancing the Radio Regulations to meet the demands of current, emerging and future radio applications, while taking into account existing services and usage"

Policies directly incentivising rural / remote penetration

- Use of Universal Service Funds to support Telecentres and backhuls
 - Most common policy with some countries including broadband e.g. Pakistan, Malaysia
 - Mandatory tower sharing under towers supported by USO Fund e.g. India

- Incentives in license conditions
 - License renewal
 - Roll out obligation

- Tax incentives

- Government funding to support broadband penetration (using PPP model)
 - Details provided further



Table 3: selected Operators Investment Plans for ICT Infrastructure and National Stimulus Plans

Country	Announced	Date	Investment	Goals and Targets	Speeds
Austria	Telekom Austria	2004	EUR 780m (US\$ 1,130m)	Full conversion of core to NGN started in 2004; to be completed by 2012	20 Mbps
Australia	Government	2008	US\$ 3 bn	Fibre all the way to the premises for 90% Australians	100 Mbps
Australia	Telstra	Nov 2005	AU\$ 10 bn	IP core network by 2007-2010 for 90% HHs in 8 yrs	100 Mbps
Belgium	Belgacom	2007	647m EUR	High-speed Broadway project for IP/MPLS network 2008-12 for 80% homes	100 Mbps
Canada	Government	Jan 2009	CAD 225m (US\$ 211m)	BB coverage for unserved rural & remote communities over 3 years	N/A
Denmark	TDC	2006	N/A	TDC will establish NGN single IP-based network for 75% HHs 2009, 90% HHs 2010, 75% HHs 2010	20 Mbps 20 Mbps 100 Mbps
Finland	Government	Sept 2008	EUR 200m (US\$ 291m) in PPP	Extending ultra-fast broadband for 100% HHs by 2016	1 Mbps 2010; 100 Mbps 2016
France	Government		N/A	Access to BB by 2010; mobile broadband by 2012 for all	N/A
France	France Telecom	Jan 2006	EUR 3-4.5 bn (US\$ 4-6.6 bn) by 2012	1m HHs passed with fibre in 2008; 4m HHs passed in 2012	N/A
EU	European Commission	Nov 2008	EUR 1 bn (US\$ 1.46 bn)	100% coverage of high-speed Internet by 2010, focusing on rural communities	N/A
Germany	Government	2009	EUR 150m (US\$ 219 m)	Nationwide capable BB access no later than end 2010. 2010- unserved areas. By 2014, 75% HHs broadband	Target 50 Mbps
Germany	Deutsche Telekom	2005	EUR 3 bn (US\$4.4 bn)	PSTN to be fully substituted by 2010 VDSL & HDTV for 30% HHs with 50 Mbps	50 Mbps VDSL and FTTC
Greece	Government	Sept 2008	2.1 bn EUR (US\$ 3 bn)	Tender for fibre network roll-out for seven years from 2009/2010	100 Mbps FTTH/B
Ireland	Government	2009	EUR 223m (US\$ 318m)	Universal broadband coverage by Sept 2010	1.2 Mbps
Ireland	Eircom	2006	EUR 60m upgrade	Migrate NGN core network and deploy fibre network in towns	1-24 Mbps
Italy	Telecom Italia	2006	EUR 60m over 2007-2017	Migration of access network to NGN for 98.5% population broadband 5.2% fibre 2009	4 -100 Mbps
Japan	Government	Sept 2008 April 2009	¥ 37.1 billion (US\$ 395 m)	ITS, improving IT infrastructure, training IT staff & new industries, with BB roll-out to rural areas	N/A

Table continued

Investment plans for ICT Infrastructure and National Stimulus Plans -II

Country	Announced	Date	Investment	Goals and Targets	Speeds
Korea, Rep.	Government	Feb 2009	US\$ 890m	Increase national broadband infrastructure speeds tenfold by 2012	1 Gbps by 2012
Latvia	Latt telecom	2009	N/A	Plans to replace DSL by FTTH 2009-2012, FTTH under trial in some cities	100 Mbps 500 Mbps
Luxembourg			EUR 195m (US\$ 285m)	Accelerating build out of Luxconnect highway	N/A
Netherlands	KPN	2005 - NGN 2008 - FTTH	EUR 6-7 bn	Migration of network to NGN - all IP backbone planned for 2010	N/A
New Zealand	Government	March 2009	NZ\$ 1.5 bn state; private?	Ultra-fast broadband by 2019; 75% population coverage	Fibre
Norway	Telenor	2005 - NGN 2007 - FTTH	N/A	Core IP MPLS network by 2010, using PON, DSL and WiMAX for full coverage	FTTH
Poland	Telekom. Polska (TP)	Sept 2008 - NGN & FTTH	EUR 400m	TP is investing in passive optic networks from 2009-2011	50 Mbps
Portugal	Government	Jan 2009	EUR 800 m (US\$ 1,168 m)	Subsidized investments optic fibre for 1.5m users in NGN networks	N/A
Singapore	Government	2007 - 2008	SG\$ 1 bn (US\$ 710m)	NGN Broadband Network to cover 60% premises by 2010 and 95% premises by 2012	1 Gbps+
Slovak Rep.	Slovak Telekom	2004	N/A	Digital NGN core network & overlay for 40% HHs by 2010	Fibre
Spain	Government	2008	N/A	Installing next generation fibre and regulating broadband	Up to 30 Mbps
Spain	Telefónica	May 2006	EUR 1 bn	Investing in next generation FTTH with 40% population coverage in 2009	25 Mbps
Sweden	TeliaSonera	End 2004	SEK 200m (US\$ 26m)	Multiple operators moving to IP and IMS core networks; National target of BB for all HHs by 2010	10 Mbps
UK	Government	Jan 2009	To be announced	Universal service commitment for BB for virtually every community by 2012	2 Mbps by 2012.
UK	BT	2004	GBP 1.5 bn (US\$ 2.2 bn)	BT launched 21st Century Network in 2004 and its super-fast broadband plan in Openreach in mid-2008 for 40% or 10m HHs	40-100 Mbps
US	Government	2009	US\$ 7.2 bn	To foster BB service to unserved/underserved areas, schools, libraries, health providers etc.	No set minimum

Sources: Qiang (2009), OECD (2009), Dr. Vaiva Lazauskaitė (2009), Booz & Company (2009).

Note: Currency equivalents are presented in original form, so as not to distort the sources, so USD conversions do not all use the same exchange rate.

Rules to curtail risks of market distortion

An example

EC Rules for State Aid for Broadband

In principle, infrastructure support must be given only to bridge the digital divide. Support should, therefore, be limited to areas where it is not commercially viable for private sector operators to establish adequate facilities. The European Commission distinguishes in this context between white, grey and black areas.

1. White areas are sparsely populated rural zones, where no broadband access except via satellite or leased lines is available. In such areas, state aid is in general allowed (rural broadband in Greece, optical fibre and rural internet access in Lithuania).
2. Grey areas are areas where broadband is already provided. Here, permission for state aid demands a more detailed assessment (optical fibre infrastructure for wholesale provision in urban Ireland through a publically owned network).
3. Black areas are those where at least two competing infrastructures exist, and where there will be a high risk for market distortion if state funding is allowed -in such areas state aid is generally not allowed.

Source: Investment Dimensions in a Universal Service Perspective: Next Generation Networks, Alternative Funding Mechanisms And Public-Private Partnerships, Morten Falch and Anders Henten



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Reference Materials from ITU-D on Broadband

Towards Universal Broadband Access in Australia

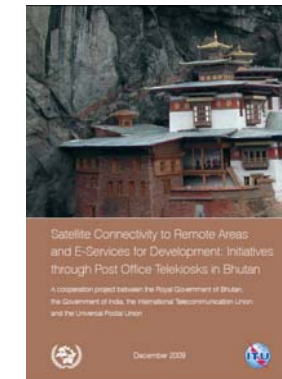
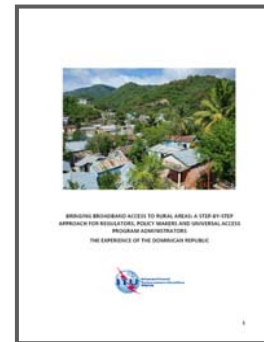
Satellite Connectivity to Remote Areas and E-Services for Development: Initiatives

through Post Office Telekiosks in Bhutan

Developments of Next Generation Networks (NGN): Country Case Studies

Bringing Broadband Access to Rural Areas: A step - by - step approach for regulators, policy makers and universal access program administrators - The experience of the Dominican Republic

School connectivity toolkit



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ITU Initiatives to promote diffusion of broadband wireless

ITU Overview

- Founded in 1865
- Leading UN Special Agency for ICTs
- HQs in Switzerland

- Three sectors: ITU-T, ITU-D, & ITU-R
- 4 Regional Offices & 7 Area Offices
- 191 Member States; and
- 700 Sector Members

ITU-D

Established to help spread equitable, sustainable and affordable access to ICT.

ITU-T

ITU's standards-making efforts are its best-known – and oldest – activity.



ITU-R

Managing the international radio-frequency spectrum and satellite orbit resources

ITU TELECOM

Brings together the top names from across the ICT industry & ministers and regulators for a major exhibition, a high-level forum & a host of other opportunities



Build on Broadband
Overview
The Vision
Key Economic Sectors
Background Documents
Related Links
ITU and the MDGs
Next Generation Networks
Connect the World Initiative
ICT Statistics



In the 21st century, the social and economic development of every country on earth will depend on it.



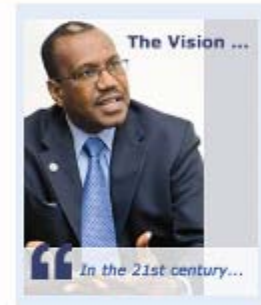
It's about completely transforming the way essential services are delivered – from e-health to e-education to e-commerce to e-government. And it's about helping meet the Millennium Development Goals in every sector.

National Broadband Networks deliver benefits across the whole of society. That makes them incredibly **cost-effective**, especially when you look at the savings across multiple sectors.

This is why one of ITU's key priorities is the delivery of **equitable, affordable** broadband access to the Internet. For all people – wherever they live and whatever their circumstances.

A **National Broadband Vision** needs to be driven by leaders at the very highest level. Leaders who clearly recognize the national interest and are not hampered by being tied to any individual sector like health, education or energy.

In the 21st century, broadband networks are **basic national infrastructure** – just like transport, energy and water networks.



Everything else will follow...

- Build broadband networks and everything else will follow:**
- The ability to control and use **energy** more efficiently.
 - The ability to manage **healthcare** in poor, ageing or isolated populations.
 - The ability to deliver the best possible **education** to future generations.
 - The ability to take better care of our **environment**.
 - The ability to streamline **transport** networks.
- And, crucially, the ability to help meet the **Millennium Development Goals**.

ITU Study Questions linked with Broadband Wireless

ITU-R	<p>Working Party 5D – IMT Systems http://www.itu.int/ITU-R/index.asp?category=information&mlink=imt-advanced&lang=en Study Group 1: Spectrum Management Study Group 5: Terrestrial Services</p>
ITU-D	<p>Study Group 1 Q 7-2/1: Regulatory policies on universal access to broadband services Q 22/1: Securing information and communication networks: Best practices for developing a culture of Cybersecurity Study Group 2 Q 10-2/2: Telecommunications for rural and remote areas Q 18-1/2: Implementation aspects of IMT-2000 and information-sharing on systems beyond IMT-2000 for developing countries Resolution 9 : Participation of countries, particularly developing countries, in spectrum management Q.20-2/2: Examination of access technologies for broadband telecommunications</p>
ITU-T	<p>Study Group 13 Q 6/13 Mobile telecom network architecture for NGN Q 10/13 Identification of evolving IMT-2000 systems and beyond Q 11/13 Convergence of existing and evolving IMT and fixed networks Q 15/13 Applying IMS and IMT in developing country mobile telecom networks Q 16/13 Security and identity management</p>



ITU-D Programmes

Six Operational Programmes

Programme 1: Regulatory reform

Programme 2: Information and communication infrastructure and technology development

Programme 3: E-strategies and ICT applications

Programme 4: Economics & financing, including costs and tariffs

Programme 5: Human Capacity Building

Programme 6: Least developed countries (LDC) and Small Islands Developing States (SIDS), and emergency telecommunications

Special Initiatives

Gender, Children and Youth, Indigenous people and communities, Persons with disabilities, Communities living in Remote/Underserved areas

5 Asia-Pacific Regional Initiatives

Various projects & actions



ITU Asia-Pacific Regional Initiatives

(2007-2010)

ASP Regional Initiative 1

Telecommunication/ICT policy and regulatory cooperation in the Asia-Pacific region

ASP Regional Initiative 2

Rural Communications - Infrastructure development

ASP Regional Initiative 3

Next Generation Networks (NGN) planning

ASP Regional Initiative 4

The unique telecommunication/ICT needs of Pacific islands and small island developing states (SIDS) in the Asia-Pacific region

ASP Regional Initiative 5

Strengthening the collaboration between ITU-T and ITU-D

Funding

*Doha Action Plan (DAP)
ITU-D Annual Operational Plan*

RI Linked Projects (RI & External Funds)

ICT Development Fund

Delivery Method

Seminars & Workshops

*Country Specific Actions
Human Capacity Building
Trainings / Fellowships*

Deployment of Infrastructure

Study Questions

Through
PPP



International
Telecommunication
Union

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ITU Asia Pacific Initiatives in Rural ICT Development

ITU-ADB Rural ICT Policy Advocacy, Capacity Building and Knowledge Sharing

- Case studies of six countries i.e. India, Indonesia, Korea R.O., Malaysia, Philippines, PRC
- Advisory support for ICT policy and regulations in two countries i.e. Cambodia and Mongolia
- Expected outputs are toolkits and guidelines on rural ICT development for policy makers and regulators

ITU-NTC Universal Service Obligation in Thailand and International Practices

- Advisory support for review and recommendations on USO policy in Thailand
- Country case studies on USO and rural ICTs

Country specific assistances to develop rural communication

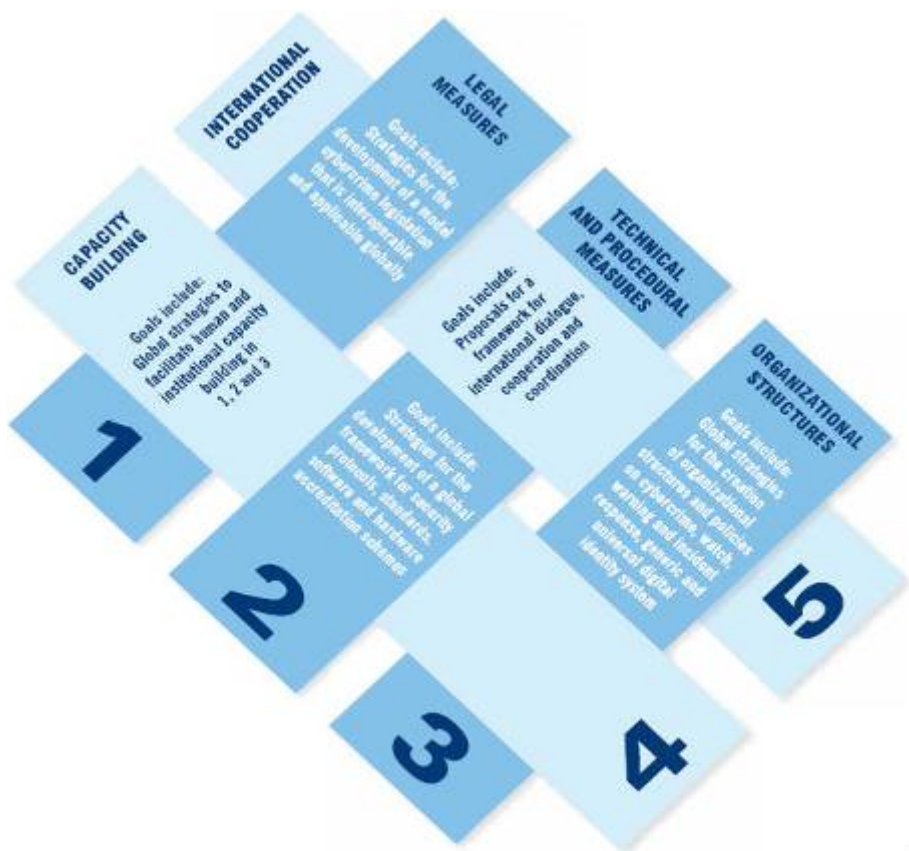
- e.g. Tonga, Papua New Guinea, Nepal

ITU welcomes Japan for one of country case studies and for an opportunity to implement a pilot project on rural ICTs in countries in the Asia-Pacific region

Securing the network and building user confidence

In line with WSIS C 5: Building confidence and security in the use of ICTs

Global Cybersecurity Agenda is an international framework for collaboration on cybersecurity matters addresses **5 main areas:**

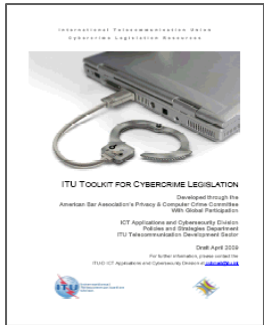


1. Legal Measures
2. Technical & Procedural Measures
3. Organizational Structure
4. Capacity Building
5. International Cooperation



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ITU Publications

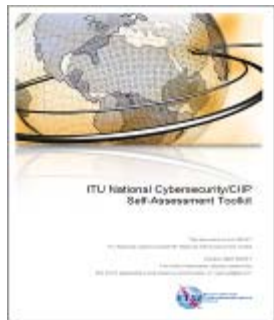
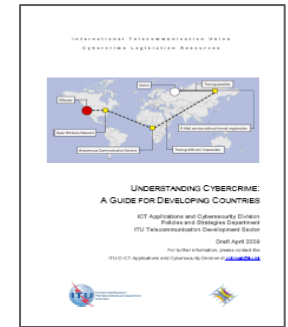


ITU Toolkit for Cybercrime Legislation

aims to provide countries with sample legislative language and reference material that can assist in the establishment of harmonized cybercrime laws and procedural rules.

www.itu.int/ITU-D/cyb/cybersecurity/legislation.html

ITU Publication on Understanding Cybercrime: A Guide for Developing Countries provides a comprehensive overview of the most relevant topics linked to the legal aspect of cybersecurity and cybercrime.



ITU National Cybersecurity/CIIP Self-Assessment Tool

To assist governments in examining existing national policies, procedures, norms, institutions and other elements necessary for formulating cybersecurity strategies

www.itu.int/ITU-D/cyb/cybersecurity/readiness.html

ITU Study on the Financial Aspects of Network Security: Malware and Spam, 2008

The study develops a framework within which the financial impacts and implications can be assessed and brings together the many disparate sources of financial data on malware and spam.

www.itu.int/ITU-D/cyb/cybersecurity/spam.html

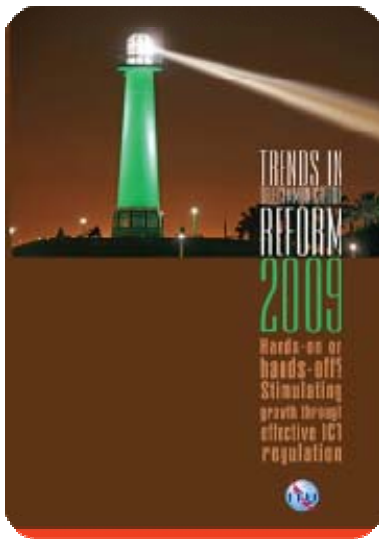


Trends in Telecommunication Reform 2009

Hands-on or Hands-off?

10th edition

Stimulating growth through effective ICT regulation



- 1 – Market and regulatory trends in the ICT sector
- 2 – Connectivity, openness and vulnerability: challenges facing regulators
- 3 – The impact of effective regulation on investment: an investor's perspective
- 4 – Effective regulation: the 'stimulus plan' for the ICT sector
- 5 – Coexistence of traditional and IP interconnection
- 6 – Mobile termination rates: to regulate or not to regulate?
- 7 – The future of VoIP interconnection
- 8 – VoIP: enemy or ally?
- 9 – Consumer protection: meeting the needs of the connected consumer

Summary

- Development and cost effectiveness of rural broadband services is very important for developing countries
- Policy framework is crucial for promoting broadband wireless in rural and remote areas
- Government has a significant role in leading the initiative
- Caution is necessary to prevent distortion of competition
- Building user confidence is a prerequisite to ensure the success of wireless services in a broadband era as it involves content



ITU Publication Research Resource

Policy
Regulation
Statistics



<http://www.itu.int/pub/D-REG-TTR.9-2007>

<http://www.itu.int/ITU-D/icteye/Default.aspx>



<http://icttoolkit.infodev.org/en/index.html>

Spectrum
Management



<http://www.itu.int/ITU-D/tech/spectrum-management/index.html>

Spectrum Fees Databank

http://www.itu.int/ITU-D/study_groups/SGP_2002-2006/SF-Database/index.asp

Network
Planning

Network Planning

http://www.itu.int/ITU-D/tech/network-infrastructure/GNPT_Final_17August2005.pdf

Capacity
Building

Centre of Excellence E-learning Centre

<http://www.itu.int/ITU-D/hrd/>

Standards



ITU-T Lighthouse

<http://www.itu.int/ITU-T/lighthouse/index.phtml>

ITU-R Publications

<http://www.itu.int/publications/sector.aspx?lang=e§or=1>

Cybersecurity



Various Handbooks on topical issues such as NGN, IP, Emergency Communications, Cybersecurity etc.

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Thank You

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