



Broadband Policy and Opportunities in Emerging Markets Policy Issues and Case Studies

A joint presentation by DLA Piper and Akhet Consulting

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Speakers – Akhet Consulting



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Andrew served as the telecommunications regulator for 10 years at Singapore's IDA soon after its inception in 2000 and was instrumental in the development of Singapore's successful broadband model.

He has over 30 years of experience across four continents, and 40 jurisdictions. His primary focus is on market growth, strategy, the sector's direction, technical opportunities, and economic structure.



Dr. Ross Patterson
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Ross was New Zealand's Telecommunications Commissioner from 2007 to 2012 and oversaw the development of New Zealand's broadband development program.

Ross is a competition and regulatory lawyer by background, with twenty five years of extensive industry experience in competition law and the regulation of telecommunications. He has a PhD in competition law, and has regularly published articles on competition and telecommunications issues.



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Stewart has advised the Australian government on broadband policy, rollout and the development of its NBNCo.

He is a regulatory lawyer by background with more than 30 years of experience. He advises both the public and private sectors in fixed, mobile and satellite issues in developed and developing countries. He has been an expert to the European Commission, an advisor to four Secretaries General of the ITU, and was Head of Telecoms for KPMG in Middle East and South Asia between 2010 and 2012.



Paul Allen
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Paul Allen is a Partner who specialises in advising IT and telecommunication suppliers, in particular in relation to large scale outsourcing and information technology projects.

Paul also advises clients on all manner of non-contentious commercial, IT, intellectual property and data protection related issues.



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Florence is a lead telecommunications Partner in DLA Piper, with particularly focus on emerging markets and extensive experience in Africa, including Ivory Coast, Benin, Cameroon, Congo Brazzaville, RDC, Mali, Ghana, Guinea-Bissau, Guinea Republic, Chad, Algeria, Tunisia and Morocco.

She regularly advises multinational companies on a variety of matters including telecommunications, public law, utilities regulation and public procurement law, as well as PPP and infrastructure project work.



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Prior to joining DLA Piper, Eamon was Director of Legal Affairs of the Bahraini Telecommunications Regulatory Authority between 2007 to 2012. TRA Bahrain is an award winning regulator and considered as one of the most progressive in the region.

With over 7 years experience of telecommunication regulation in the Middle East he has significant insight to the issues faced by regulators and operators. Eamon recently completed a secondment with du, the UAE's challenger mobile and fixed line operator, and advises a number of multi-national clients throughout the region.

Broadband Policy and Implementation – Why?

Case studies from

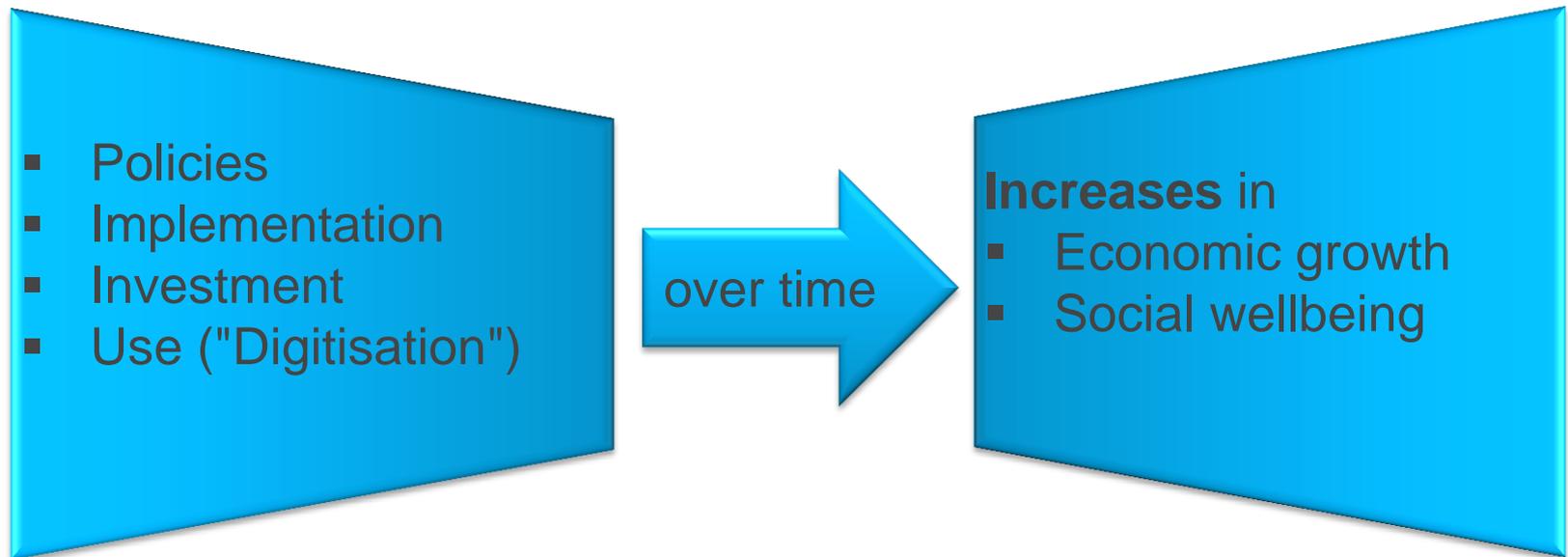
- Singapore
- New Zealand
- Australia

Updates from Africa and Middle East

Q&A and Panel Discussion



Effective Broadband Policies and their benefits



A 2009 World Bank study of economies between 1980 to 2002 found that **for every 10% increase in broadband penetration, GDP can rise by about 1.21% in developed countries, and 1.38% in developing countries.**



A 2009 report prepared for Nokia Siemens by LECG concludes that **for every 10 extra broadband lines per 100 individuals the US could increase its GDP by US\$100 BILLION.**

Social benefits



Communications



Broadband



Commerce

Health



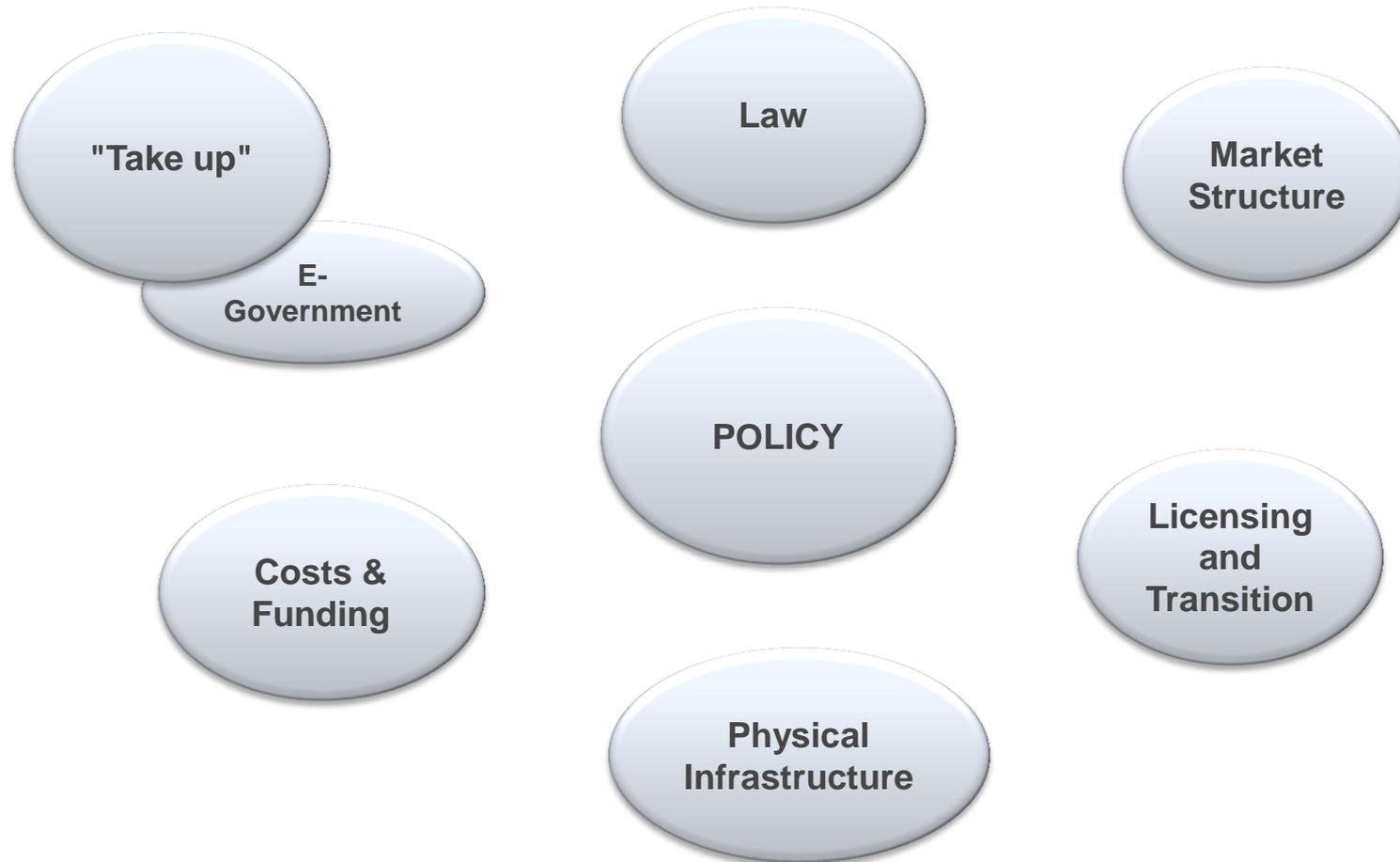
**E-
Government**



Education



No one solution fits every country but there are common issues



Singapore

Andy Haire

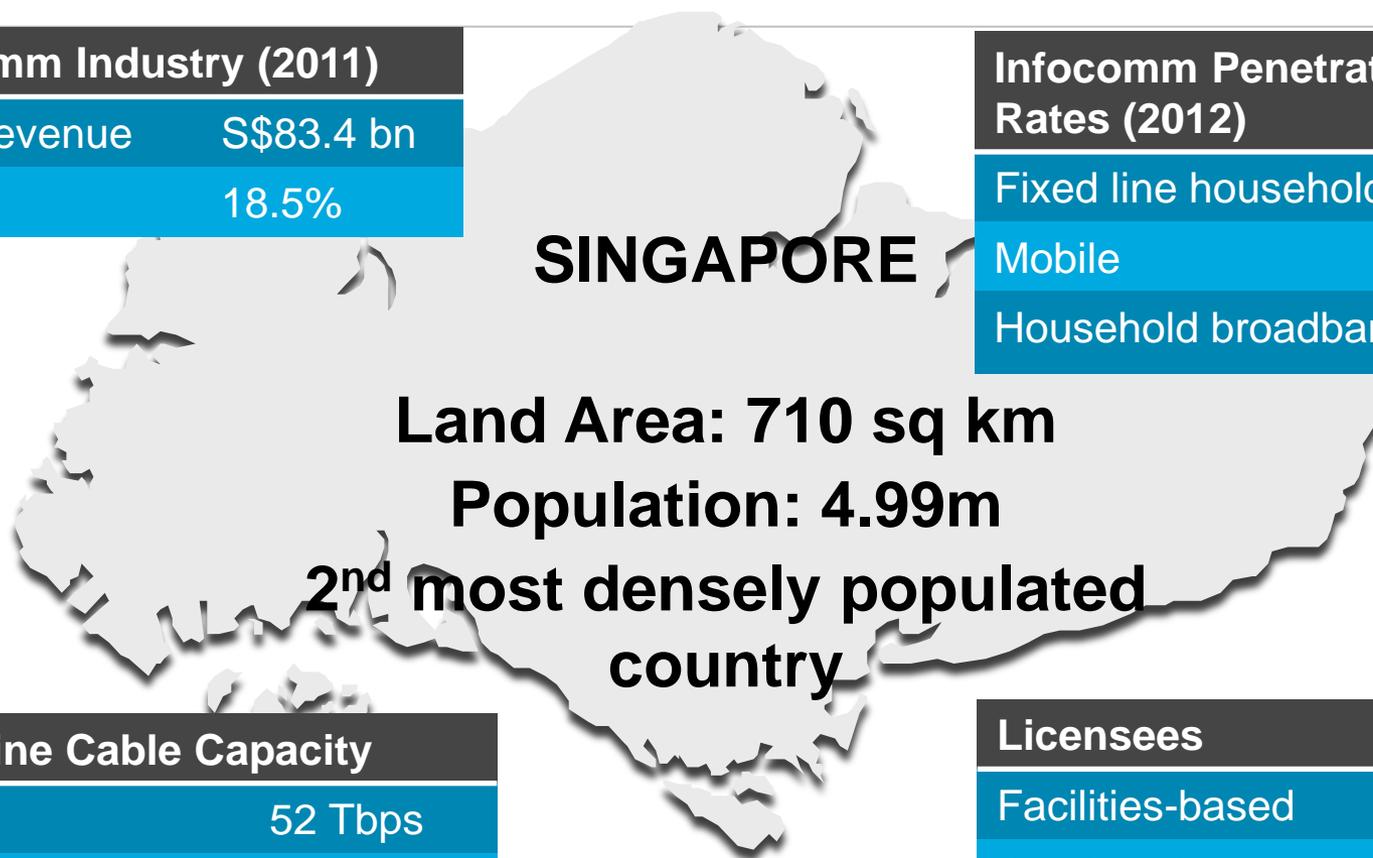


Singapore

Overview of Singapore Market

Infocomm Industry (2011)	
Total Revenue	S\$83.4 bn
Growth	18.5%

Infocomm Penetration Rates (2012)	%
Fixed line household	96
Mobile	152
Household broadband	>100

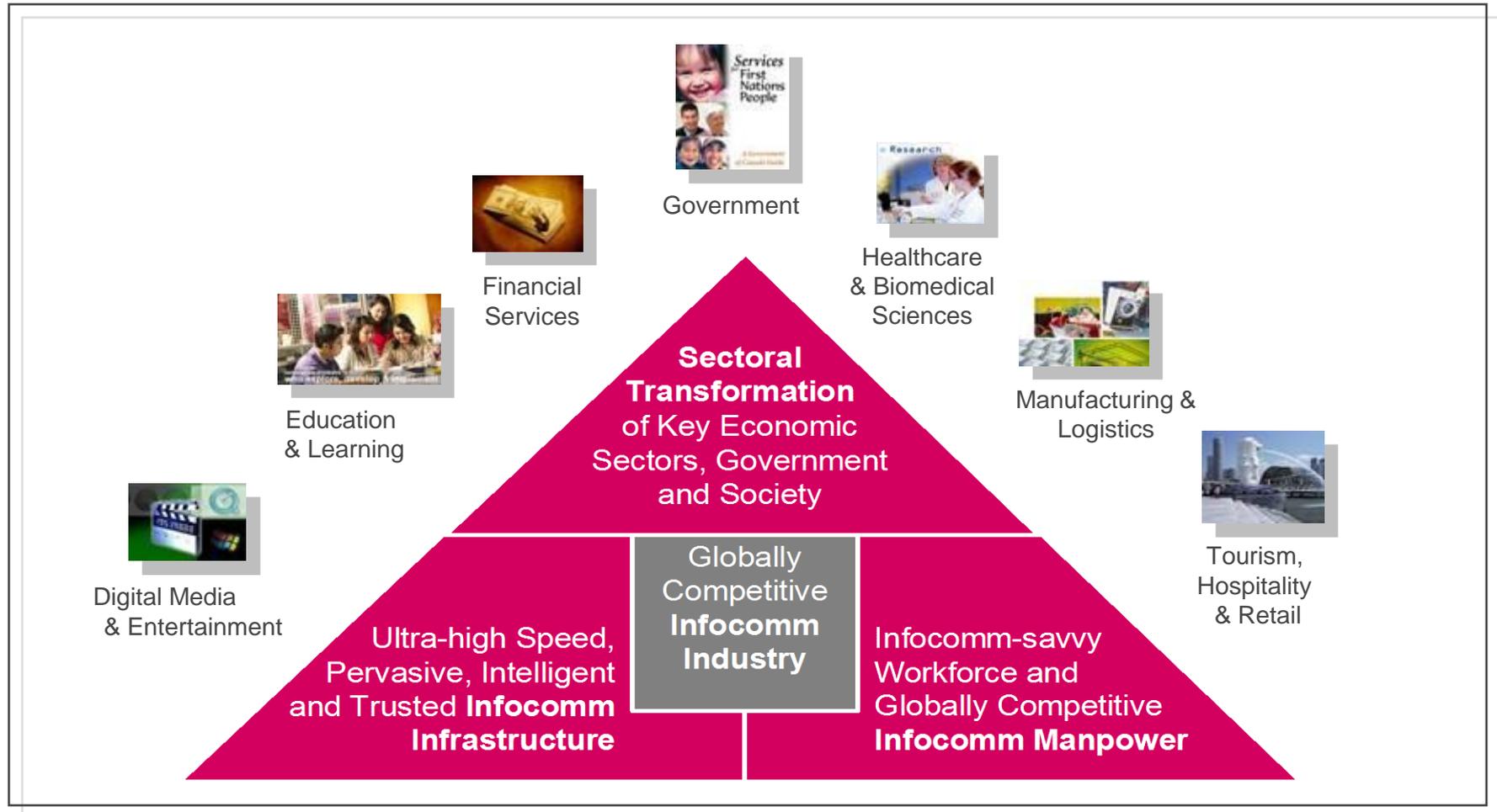


Submarine Cable Capacity	
Total	52 Tbps
Lit	7 Tbps
International Internet Bandwidth	415 Gbps

Licensees	
Facilities-based	46
Services-based (individual)	230
Services-based (Class)	800

Singapore

Singapore's ICT Plan



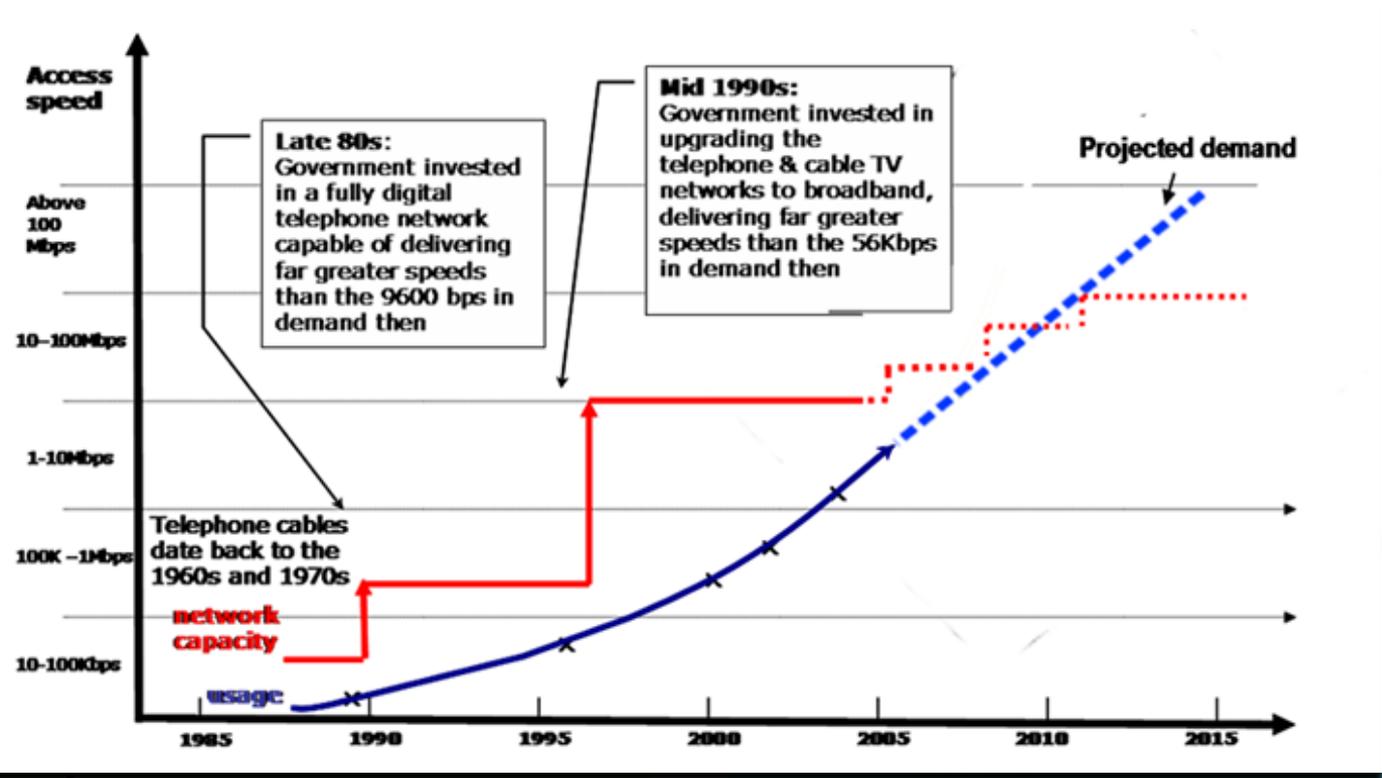
Singapore

Various Perspectives

Cons

Demand for keeps in applicat

Individual becomin



ive

(GDP)

Op

Desire to

- R
- A
- Impact future MktCap valuation?

Embrace new technology?

- Impact on future valuation of legacy network

- Transportation

Gov't understood: Demand would outstrip supply in foreseeable future

Bandwidth Drivers

Downstream increase drivers

SDTV	2 Mbps/channel
HDTV	6 Mbps/channel
Basic HSI	5 Mbps average
Gaming	2 Mbps/session
Multimedia surfing	8 Mbps average
Video Conf., learning	3 Mbps/session
Home working	4 Mbps average

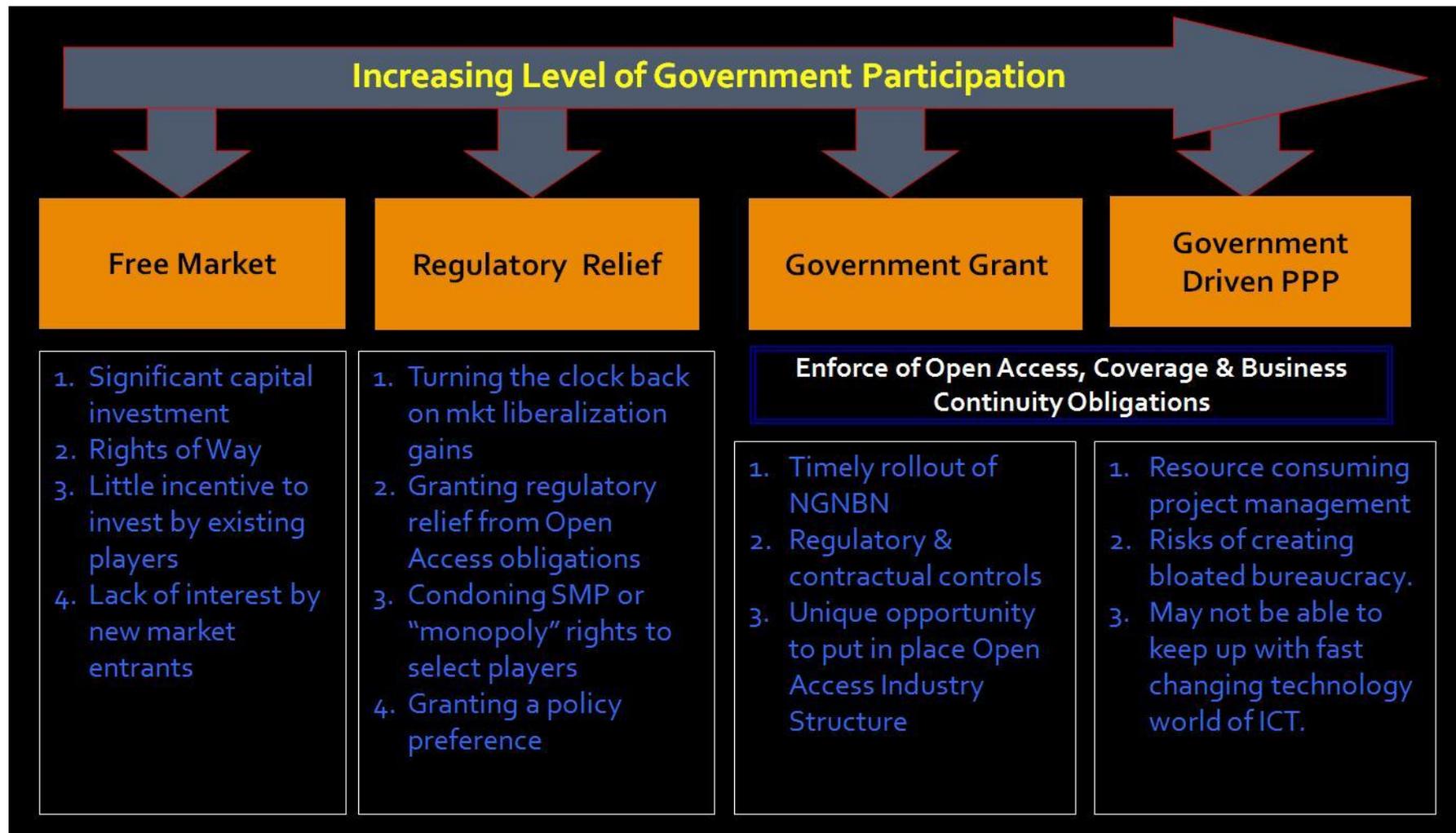
Drivers: HDTV, MPEG4, latency needs & peak usage

Upstream increase drivers

SDTV	0.2 Mbps/channel
Basic HSI	2 Mbps average
HDTV	0.5Mbps/channel
Personal content upload	3 Mbps/channel
Gaming	2Mbps/session
Multimedia surfing	2 Mbps/session
Video Conf., learning	3 Mbps/session
Remote home monitoring	0.5 Mbps/call

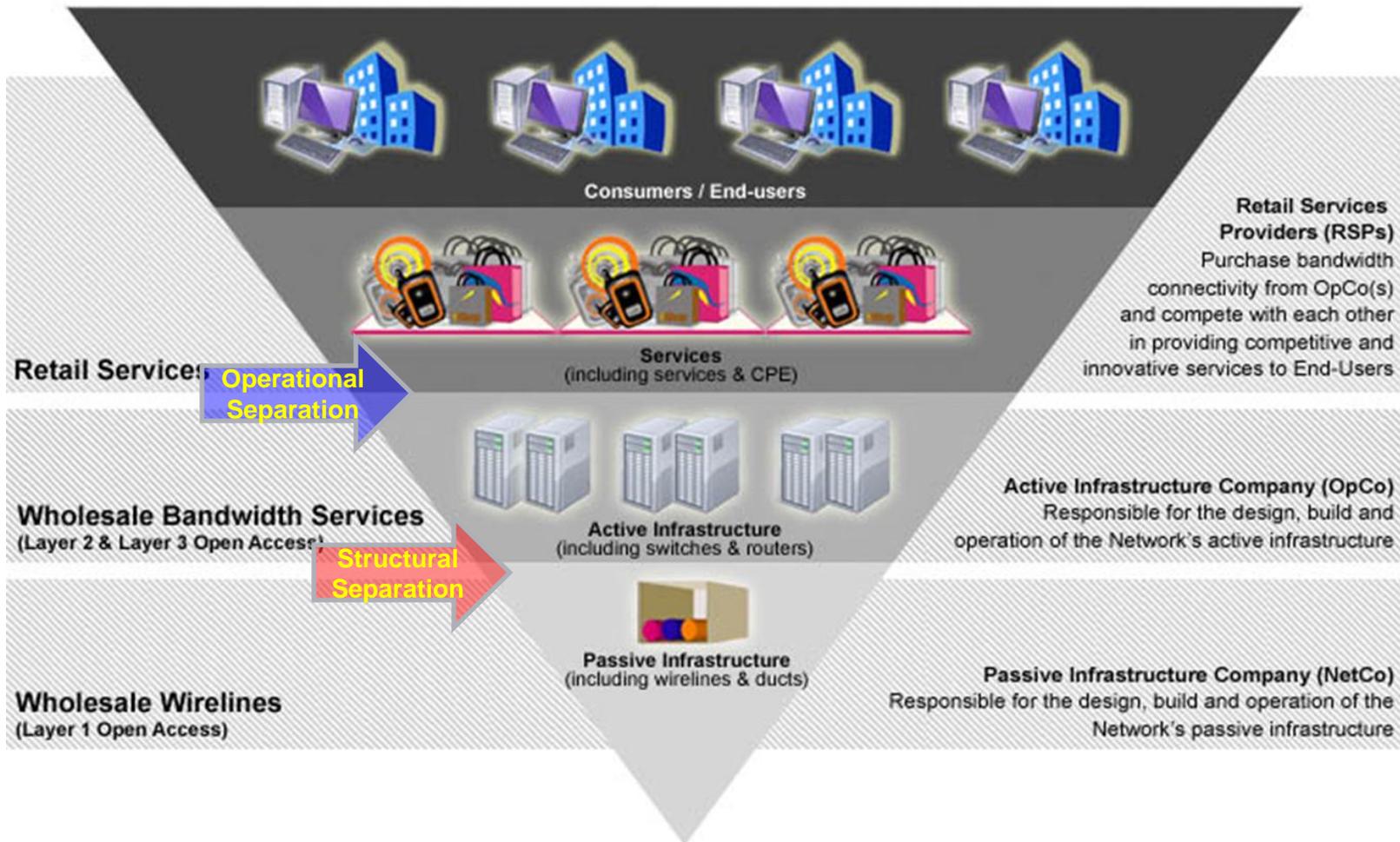
Drivers: peer-to-peer applications

- Continuous increase of bandwidth needed in future
 - Latency reduction for interactive applications
 - Bandwidth competition



Singapore

Achieving Non-Discrimination



Singapore

Metrics to Achieve Outcomes

Bandwidth Requirements

Bandwidth Type	By Commercial Operations Date	Beyond Commercial Operations Date
Peak Downstream Bandwidth per Residential Connection	100 Mbps	Shall be scalable to enable future downlink bandwidths in excess of 1Gbps per End-User Connection
Peak Upstream Bandwidth per Residential Connection	50 Mbps	Shall keep pace with or even exceed the downlink bandwidth as it is increased
Committed Downstream Bandwidth per Residential Connection	25 Mbps	Shall increase over time (required to support next generation services e.g. high definition video streams)

Premise Categories

Residential	Non-Residential	Non-Building Address Points
<ul style="list-style-type: none"> • public housing • private apartments • private landed housing 	<ul style="list-style-type: none"> • commercial blocks • industrial blocks • institutional properties • government offices • schools • hospitals • libraries 	<ul style="list-style-type: none"> • lamp-posts • bus stops • traffic junctions • lift monitoring rooms • lift lobbies • wireless access points • street-side display signs • other address points in Singapore and connected islands

ICO Mandatory

Services to be offered

> Regulated prices, offered to all qualified customers, on a transparent basis

- ICO lists the prices, terms & conditions by which the Next Gen NBN Operators must offer Mandated Services to qualifying customers;
- Contains all necessary services to provide end-to-end connectivity.
- Available in electronic format on NetCo's and OpCo's Platforms.

New Zealand

Dr. Ross Patterson



UFB Objective:

- To accelerate rollout of ultrafast broadband (100Mbps/50Mbps) to 75% of New Zealanders over 10 years
- By government investment of \$1.5 billion matched by private sector investment
- Directed to open access infrastructure

Principles

Make a significant contribution to economic growth

Neither discourage nor substitute private sector investment

Avoid entrenching the position, or 'lining the pockets', of existing broadband network providers

Avoid excessive infrastructure duplication

Focus on building new infrastructure and not unduly preserving the 'legacy assets' of the past

Ensure affordable broadband services

New Zealand

Key Aspects of UFB Initiative

Open access fibre infrastructure

\$1.5 billion of Government funding through Crown Fibre Holdings (CFH) alongside private sector co-investors

Creation of private Local Fibre Companies (LFC) – 33 candidate areas

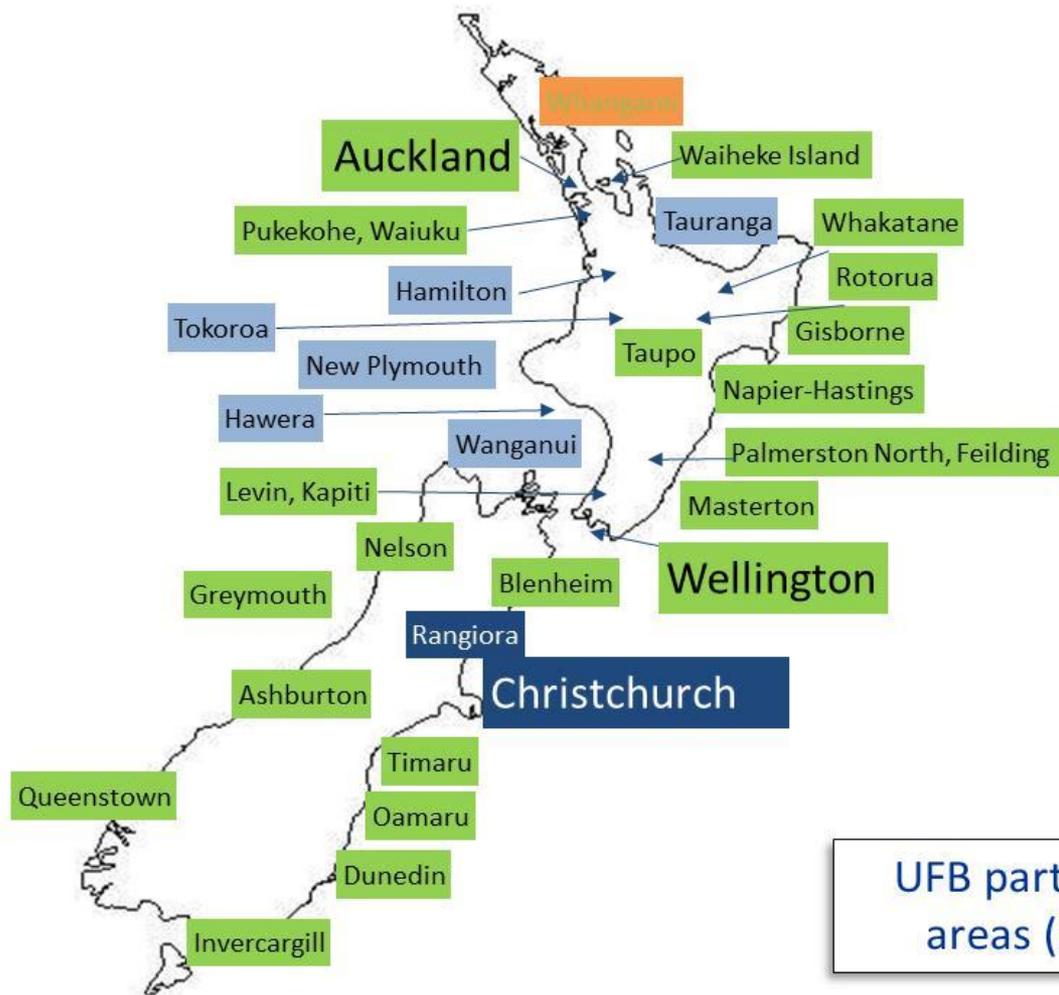
Priority to schools, hospitals, and businesses over the first six years

LFC's to provide Layer 1 and 2 services and are prohibited from entering the retail market

Therefore, to participate in UFB, Telecom was required to structurally separate

New Zealand

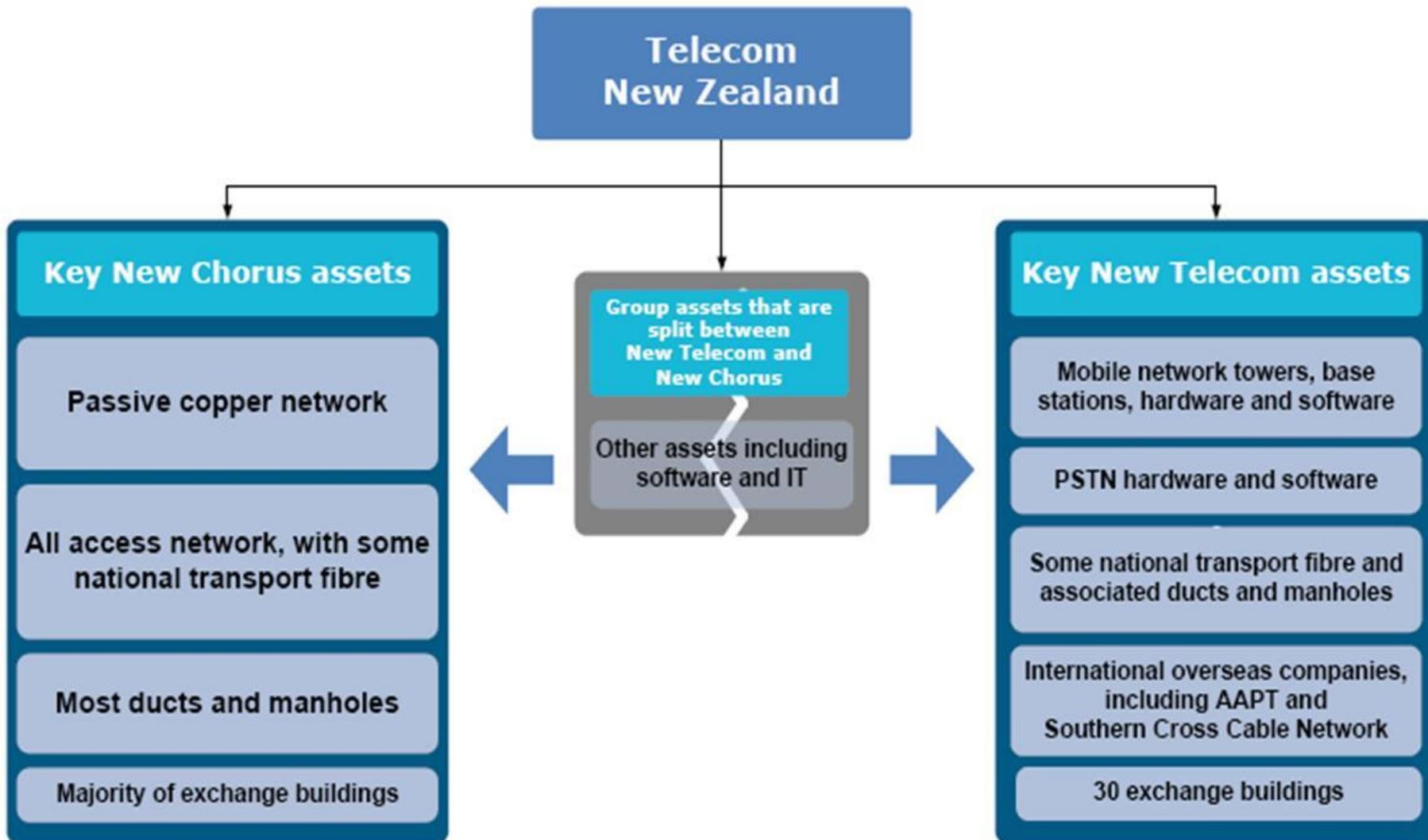
UFB Candidate Areas



	Candidate Areas	% of UFB
	2	15.3
	1	1.6
	24	69.4
	6	13.7
	33	100.0

UFB partnerships will cover all 33 candidate areas (75% of NZ population) by end 2019

New Zealand Market Structure Now



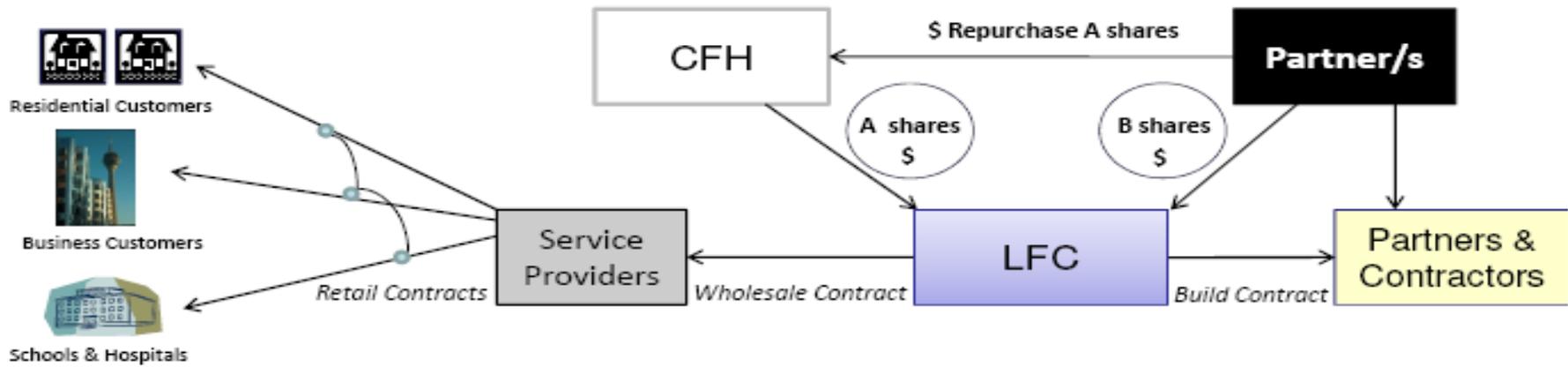
GPON for mass market

P2P for premium
business and
priority users

ITU-T G.984 standard
split 1:24 (allowing
100Mbps downstream
and 50Mbps upstream)

Standard Optical
Network Termination
(ONT) configuration; 4
Ethernet ports and 2
legacy Voice (ATA) ports

Dedicated service to a
single premise
(supplying speeds up to
10Gbps)



- **Government, CFH, Partner shareholders in LFC**
- **Funding Model – 10 year concession period:**
 - CFH funds "communal" infrastructure: issue A voting shares, no dividends
 - Partner – funds connection to end used costs: issued B non-voting 100% distribution shares. Partner receives A shares when refunding CFH for "passing" costs on an end user basis
 - Government Share, no voting rights or dividends, but has veto power
- **After Year 10 – A and B shares converted to ordinary shares. Government Share does not convert.**

Source: Crown Fibre Holdings, TUANZ Telecommunications

Total CFH funding of \$929 million

CFH equity securities:
\$464.5m

- Issued progressively as build progresses
- No voting rights
- No dividends before 2025
- Right to dividends increases if uptake 20% or less

CFH debt securities
\$464.5m

- Unsecured
- Non interest bearing
- redeemable between 2015 and 2036
- Right to redeem increases if uptake 20% or less

CFH Warrants: CFH can purchase additional shares between 2025 and 2036 if total shareholder returns exceed 16%

New Zealand

UFB Take Up

November 2011

Roll out begins

May 2012

First retail fibre offering from small player (5% market share)

June 2012

Second retail offering from small player (9% market share)

February 2013

134,000 premises passed (16%) uptake 3,806 (2.8%) (0.5%)

April 2013

Telecom (49% market share) offer fibre services bundled with copper voice.
Vodafone (29% market share) still offer no fibre services
“UFB nowhere ready for prime time”

Reasons for low uptake:

- No demand side incentives or fibre awareness programmes
- Limited retail offers
- Connection process and cost issues
- Lack of content/applications to drive demand
- but early days...

AUSTRALIA

Stewart White



Key aspects of Australian model

Structure

- **NBN Co stand-alone, Layer 2 superfast (100Mbps) bitstream wholesale only company**
 - **Retail supply of some basic services to certain utility providers is permitted**
 - **Retailers acquired by NBN Co exempted for the first 12 months**
- **Telstra 'structural' separation**
 - **Only in areas where NBN has been deployed (vertical integration will continue in areas not reached by the NBN)**

Objectives

Mix of

- **FTTP to 93% of population (initially supporting 100 Mbps downlink)**
- **Wireless to 4% and**
- **Satellite to 3% of the population (both supporting 25 Mbps downlink)**

Key aspects of Australian model (Cont)

Cost

Approx. A\$44.1 billion

- **Australian Government investing up to A\$30.4 billion in NBN Co; remainder debt funded (A\$13.7 billion)**

Ownership

- NBN Co is presently 100% government-owned
- Planned privatisation following completion of rollout

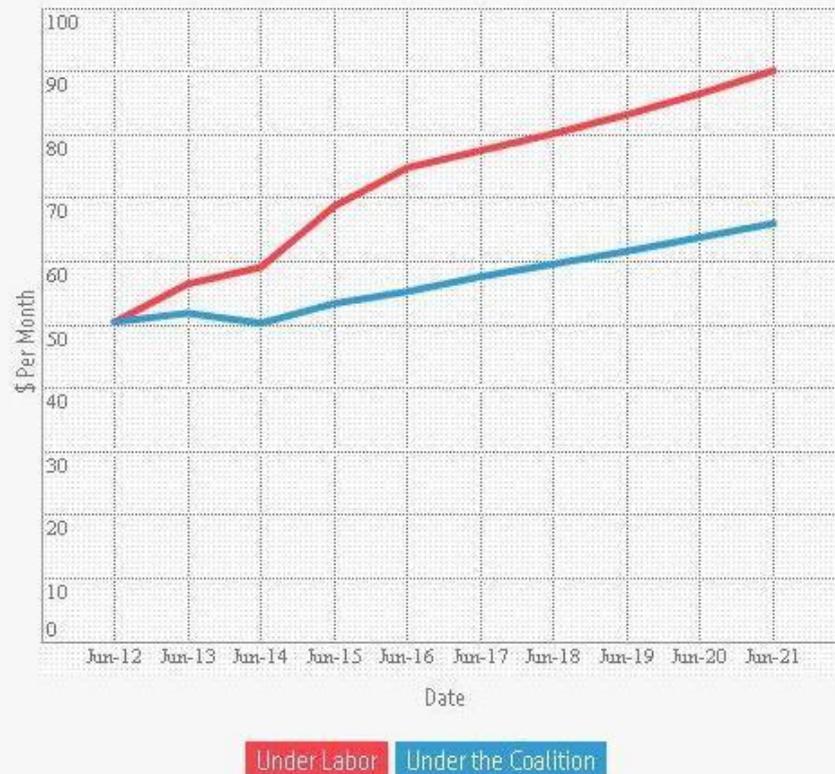
- NBN Co Special Access Undertaking for suite of “Reference Offers” for 10 years
- ACCC draft rejection on 5th April wanting:
 - greater flexibility to review prices and
 - certainty about NBN Co compliance with its obligations, specifically ACCC rulings
- Generally ACCC seems comfortable with Reference Offer prices fixed for 5 years, then subject to price increase limit of CPI-1.5%

- ACCC draft proposal re pricing:
 - Five yearly reviews of prices
 - scope for rebalancing of prices
 - Removal of discretion for new product pricing
 - Regulatory oversight of application of revenue constraint
 - NB: Initial pricing not based on LRIC estimates for NBN
 - instead designed to facilitate smooth transition from legacy copper services

- **NBN and Telstra a commercial deal**
 - **Telstra to be paid A\$11bn to:**
 - decommission copper and HFC networks and
 - provide access to passive infrastructure
 - Telstra share price improved

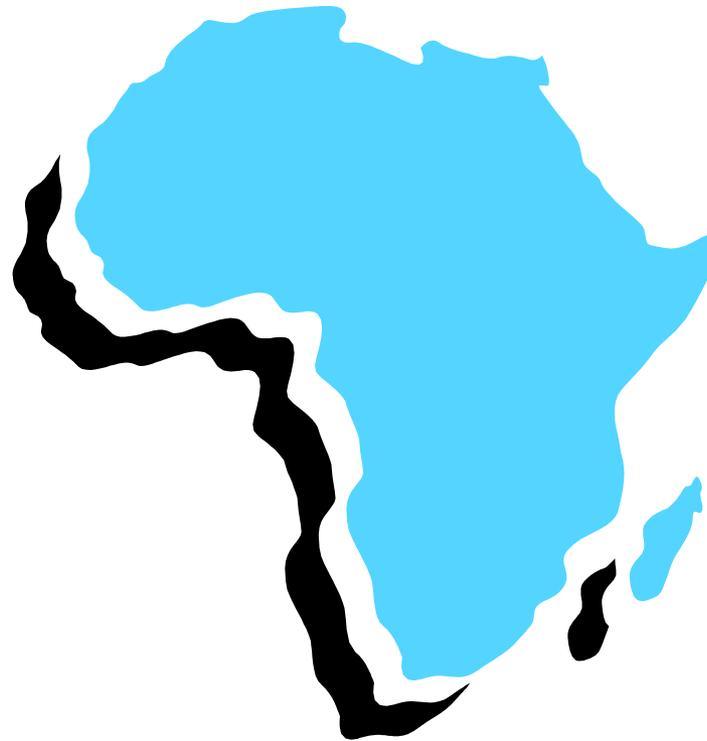
- At present rollout:
 - NBN in dispute with contractors over rollout delays
 - NBN revised 30th June 2013 figure from 341,000 homes passed now between 190,000 and 220,000
 - NBN determined to make up delay
- Understood that at January 2013 34,500 Australian homes and businesses (10.1% of premises passed) compared to 6.4% at June 2012 and 0.4% as at June 2011
- Political uncertainty given 15th September 2013 Federal election

FORECAST MONTHLY INTERNET BILLS UNDER LABOR AND THE COALITION



Africa

Florence Guthfreund-Roland



- Focus on Sub-Saharan Africa
 - 48 countries
 - 3 main regions: West, Central and East Africa
 - Considerable variations between the countries but some common characteristics

- Broadband access gap between Sub-Saharan Africa and the rest of the world is getting wider while the gap in basic voice communications is getting smaller.
 - As a consequence, increasing access to broadband connectivity is emerging as a high priority for policy makers across the continent

- Very low availability and affordability of broadband services
 - Resulting either in expensive access prices or no access at all for the customer
 - Only 2% of the Sub-Saharan population has subscribed to fixed broadband services (World Bank, 2011)

Predominance of low-capacity backbone network infrastructure



Historically, communications network infrastructure has been built to carry voice traffic

- Nigeria: example of extraordinary growth of mobile Internet use (74% of broadband subscribers relate to mobile networks in 2011)



Backbone networks are essentially wireless and not fixed broadband

- Mobile operators own 68% of the terrestrial infrastructure and almost all the satellite-based backbone infrastructure



2 factors explaining the focus on wireless backbone networks

- Voice services require less backbone capacity
 - only 12% of total terrestrial infrastructure was fiber-optic in 2010
- Need to cover the large rural population

Geographical concentration of fiber networks in urban areas and on intercountry routes



- New entrants have focused the backbone network construction in the same area as the incumbent's infrastructure, covering the same population inside major urban areas
- **Nigeria:** fixed broadband connectivity only available in 3 cities



Fiber optic cable network often connect to borders

- Kenya : the 2 major fiber networks both extend from Nairobi to the Ugandan border, even though there are few major population centers in the area, in order to carry traffic between Uganda and the coastal landing stations of the submarine cables

Market structure

Backbone infrastructure is usually owned by vertically integrated operators



Contributes directly to the phenomenon of limited aggregation of traffic on high-capacity backbone networks



- Impact of the regulatory environment
- Coexistence of policies promoting backbone infrastructure construction with other policies preventing/restraining the operators to sell backbone services to each other or to third parties



- Stage of market development
- Reluctance of backbone operators to allow competing operators to use their backbone networks
- Failure of regulators to facilitate commercial negotiations or to impose regulatory interconnection obligations or infrastructure sharing on operators

Create an enabling environment for infrastructure competition	Stimulate rollout in underserved areas
<p>Remove regulatory obstacles to investment and competition</p> <ul style="list-style-type: none"> ■ Remove limits on the number of network licenses ■ Encourage entry of alternative infrastructure providers ■ Remove constraints on the backbone services market ■ Improve the regulation of backbone networks 	<p>Implement incentive-based private sector models</p> <ul style="list-style-type: none"> ■ Provide operators with incentives to cooperate in the development of backbone infrastructure in currently underserved areas of the country where infrastructure competition is not commercially viable
<p>Reduce the cost of investment</p> <ul style="list-style-type: none"> ■ Facilitate access to passive infrastructure ■ Promote infrastructure sharing 	<p>Establish competitive subsidy models</p> <ul style="list-style-type: none"> ■ Provide operators with incentives to build networks in currently underserved areas through reductions in taxation or universal service fund (USF) contributions
<p>Reduce political and commercial risks</p> <ul style="list-style-type: none"> ■ Provide risk guarantees and political risk insurance ■ Aggregate demand 	<p>Create shared infrastructure/consortium models</p> <ul style="list-style-type: none"> ■ Provide operator(s) with a subsidy to build and operate a network in currently underserved areas of the country; provide services in these areas on a nondiscriminatory basis
<p>Promote competition in the downstream market</p> <ul style="list-style-type: none"> ■ Implement regulation that will effectively promote such competition 	

Source: *Broadband for Africa*, Mark D. J. Williams for the World Bank, 2010

- **Regional initiatives in ICT**

Regional initiatives through regulations, directives, recommendations...

All main regional communities have implemented policies for the harmonization and liberalization of the telecommunications sector policies in general

- Only **ECOWAS** provides a specific provision on broadband:

Additional Act relating to universal access and services (2007)

Member states shall implement incentives for the private sector to invest in broadband services at the local and international levels, complementary to sustainable public investments

Regional program

ECOWAS

- INTELCOM II program for development of inter-state broadband (backbone infrastructure, submarine cables) and extension of Internet coverage to rural areas

Recent projects in the private sector

Consortium of private companies for the setting-up of operations for submarine cables

- WACS cable system
 - Linking South Africa to the UK with 15 terminal stations along the western coast of Africa
 - Total cost: \$650 million
 - MTN largest investor (\$90 million)
 - Operational since 11 May 2012
- ACE cable system
 - 17,000 km-long, will eventually connect 23 countries including landlocked states like Mali or Niger
 - first international submarine cable to land in Equatorial Guinea, Guinea, Liberia, Mauritania, the Gambia, Sao Tome and Principe and Sierra Leone
 - Operational since 15 December 2012

Broadband infrastructure projects at national level

Nigeria

Regulator (NCC) implemented 3 projects promoting broadband:

- WIN
- SABI
- Universal Service Provision Fund

Target for all three projects is to achieve a rate of broadband penetration of 12% in 2012 (6.1% in 2010)

Kenya

Extension of the national optic fiber backbone infrastructure between 2013 and 2017

Target is to achieve a minimum broadband speed of 5Mdps in rural areas and 40 Mdps in urban areas in 2017

Africa

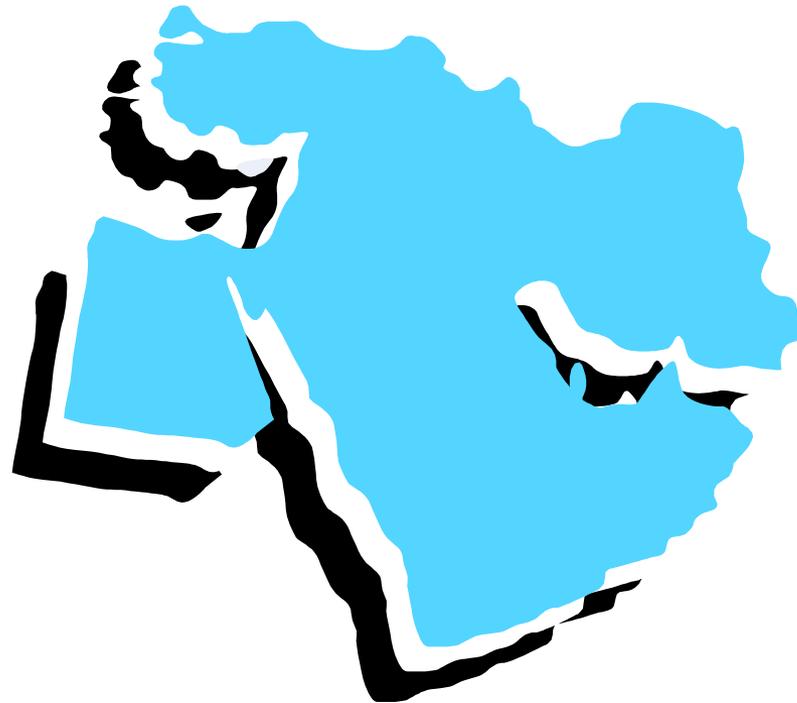
Broadband policies at national level

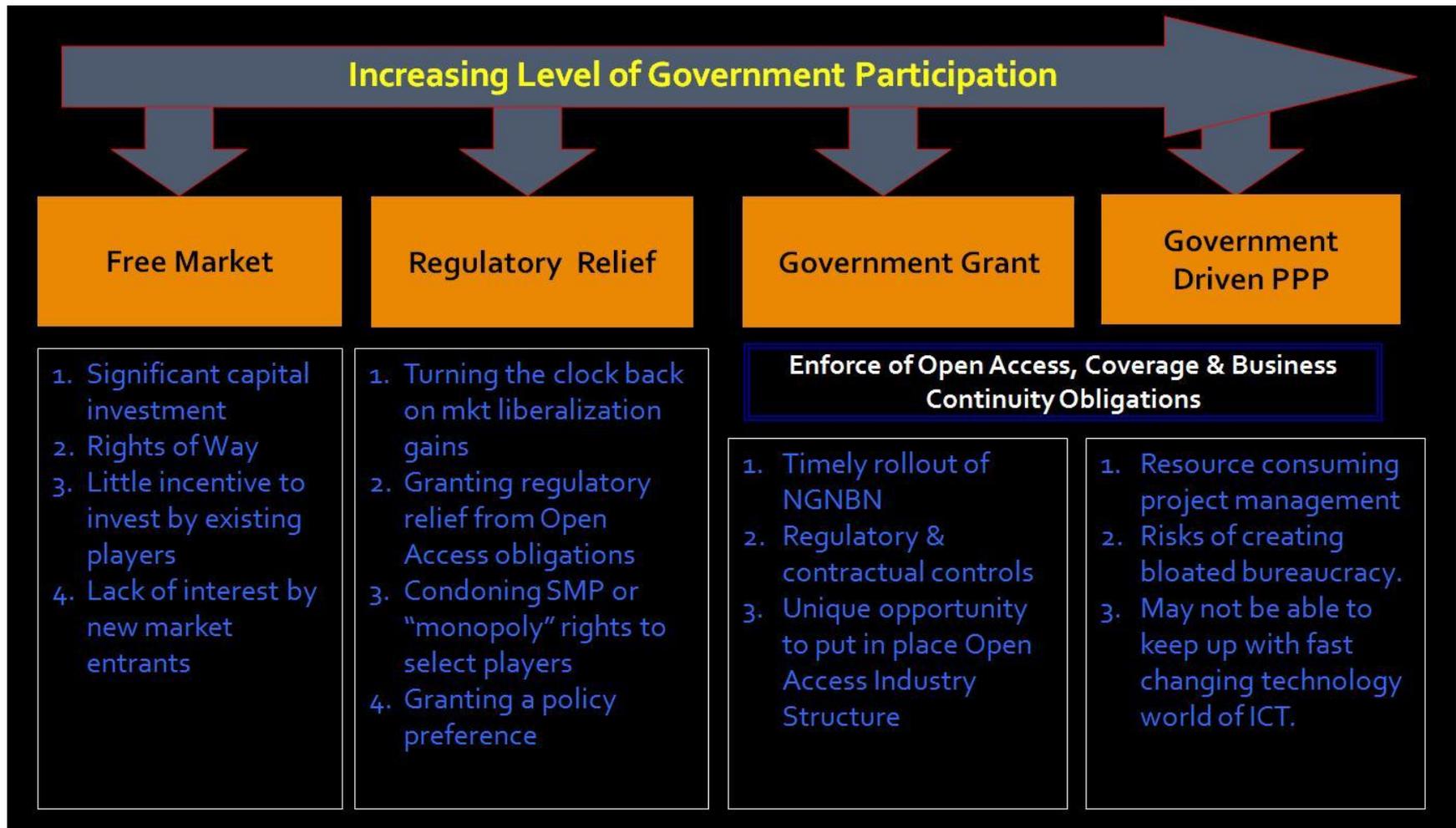
Source: Broadband Policies
Worldwide: Selected Countries,
Year 2011 (ITU)

Africa			
	Country	Country has adopted a national policy to promote broadband	If No, are there plans to adopt one?
1	Benin	No	Yes
2	Botswana	Yes	
3	Burkina Faso	Yes	
4	Burundi	Yes	
5	Cameroon	Yes	
6	Cape Verde	No	Yes
7	Central African Rep.	Yes	
8	Chad	Yes	
9	Congo	Yes	
10	Congo (Dem. Rep.)	No	Yes
11	Côte d'Ivoire	Yes	
12	Equatorial Guinea	No	Yes
13	Ethiopia	Yes	
14	Gabon	Yes	
15	Gambia	Yes	
16	Ghana	Yes	
17	Guinea	Yes	
18	Kenya	Yes	
19	Lesotho	No	Yes
20	Malawi	Yes	
21	Mali	No	
22	Mauritius	Yes	
23	Namibia	Yes	
24	Niger	Yes	
25	Nigeria	Yes	
26	Rwanda	Yes	
27	Seychelles	No	
28	South Africa	Yes	
29	Swaziland	No	No
30	Tanzania	Yes	
31	Togo	No	Yes
32	Zambia	No	
33	Zimbabwe	Yes	

Middle East

Eamon Holley





Middle East Policy

UAE	Bahrain	Saudi Arabia	Qatar
<ul style="list-style-type: none"> No public broadband policy per se Vision 2021 e-government vision 2011-2013 	<ul style="list-style-type: none"> 2010 Policy for NBN 2012 Third National Telecommunications Plan Bahrain 2030 Vision 	<ul style="list-style-type: none"> Universal Access and Universal Service Policy 2006 UAUS Fund 2007 Strategy plan finalised in 2010 Saudi Arabia Economic Vision Saudi Arabia 2025 	<ul style="list-style-type: none"> No published whole policy Policy found throughout ictQatar website ICT Policy 2015 Q.NBN License Qatar 2030 Vision
<p>"Outstanding information and communication infrastructure will network our businesses together and give them a leading edge as they transact and interact with the world. Individual citizens will also reap the benefits of efficient connectedness in their digital lives as they search online for knowledge and the fulfilment of intellectual curiosity."</p> <p>http://vision2021.ae/united-in-knowledge.php</p>	<p>"Government has concluded that Bahrain will be severely disadvantaged if it too is not provided with a secure ultra fast broadband fibre optic infrastructure."</p> <p>"Normal market dynamics and mechanisms may not yield the desired infrastructure and services in a minority of cases. Government recognises that it may be ultimately appropriate, when the extent of organic provision has been assessed, to establish formal enabling mechanisms, that include obligations and/or incentives applied to Licensees."</p> <p>http://www.tta.bh/EN/pdf/ThirdNationalTo</p>	<p>Objectives. To Achieve:</p> <ul style="list-style-type: none"> Universal access to voice services within a period of no more than 3 years Universal service for voice services within a period of no more than 5 years Universal access to internet services within a period of no more than 5 years Universal service for internet services within a period of no more than 7 years <p>http://www.citc.gov.sa/English/RulesandSystems/UniversalServicePolicy/Documents/TheUniversalAccessandUniversalServi</p>	<p>Speed: the network will allow high Internet speeds that exceed 100 MB per second for all household connections with an estimated coverage of 95% of Qatar's households by 2015.</p> <p>Availability: broadband services will be available with competitive pricing to all sectors of society.</p> <p>Open Access: the network will allow open and fair access for broadband services for all licensed operators via a robust legal framework that ensures legal compatibility.</p> <p>http://www.ictqatar.qa/en/department/national-programs/ict-infrastructure/national-broadband-network</p>

Middle East Implementation

UAE	Bahrain	Saudi Arabia	Qatar
<ul style="list-style-type: none"> 2 fixed line and mobile operators du and Etisalat 	<ul style="list-style-type: none"> Open market 1 national fixed line network 2 national fixed wireless "Wi-max" licensees 3 mobile operators A number of ISPs without network 	<ul style="list-style-type: none"> 3 mobile operators STC, Mobily, Zain 2 fixed operators STC, Atheeb ("Go") A number of ISPs without network 	<ul style="list-style-type: none"> 2 fixed line and mobile operators Ooredoo and Vodafone
<p>Rely upon existing licensees</p>	<p>Rely upon existing licensees</p> <p>2010 NBN Policy refers to using the Electricity and Water Authority's ("EWA") fiber network</p>	<p>Existing Licensees awarded USF concessions in specific regions based upon a bidding process</p>	<p>Q.NBN established in 2011</p>
<ul style="list-style-type: none"> du, small but solely fiber network Etisalat, national (apart from du areas), mix of fiber and copper 	<ul style="list-style-type: none"> Batelco self funded an NGN backbone Focus on traditional wholesale models, bitstream and LLU on copper access networks 	<ul style="list-style-type: none"> Saudi the largest country of four, with most dispersed population Mix of fixed line and mobile broadband services 	<ul style="list-style-type: none"> To provide passive infrastructure and ancillary services in the last mile Open access model Focus on fiber rollout

Middle East Results?

UAE	Bahrain	Saudi Arabia	Qatar
<p>No fixed line competition</p> <p>Mobile competition</p>	<p>Competition through a mix of fixed line, wimax and mobile broadband</p> <p>Not clear what is happening yet with EWA fibers and NBN.</p>	<p>Focus on mix of fixed and mobile coverage solutions to remote areas</p> <p>Number of USF subsidies have been awarded since 2010 to all 3 mobile operators</p>	<p>Some Q.NBN rollout in a limited area near Doha http://qnbn.qa/follow-the-progress/</p> <p>March 2010 Ooredoo announced rolling out of 100% FTTH http://dohanews.co/post/18718207584/track-qtels-fibre-internet-rollout-with-this-handly-map</p>
<p>At June 2012 had 70% internet penetration Source: ITU</p>	<p>At June 2012 had 77% internet penetration Source: ITU</p>	<p>At June 2012 had 49% internet penetration Source: ITU</p>	<p>At June 2012 had 86.2% internet penetration Source: ITU</p>
<p>UAE 25th "most networked country" Source: WEF</p>	<p>Bahrain 29th "most networked country" Source: WEF</p>	<p>Saudi Arabia 31st "most networked country" Source: WEF</p>	<p>Qatar 23rd "most networked country" Source: WEF</p> <p>Singapore 2nd Australia 18th New Zealand 20th</p>

- Broadband policies can focus the minds of government, regulators, operators and consumers on a common goal
- Benefits of a concerted effort seem clear
- Policy needs to be adapted to the specific characteristics of the country in question, its current needs and its future aspirations
- Many models by which this can be achieved
- Key focus of all stakeholders are:
 - Policy objectives
 - Framework and implementation
 - Costs
 - Utilisation and return on investment

Q&A and Panel Discussion

THANK YOU